16-166

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

No. ~~330~~ 64

THEODORE CLOUGH, APPELLANT,

vs.

THE GILBERT & BARKER MANUFACTURING COMPANY, JOHN F. BARKER, AND CHARLES N. GILBERT.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE SOUTHERN DISTRICT OF NEW YORK.

FILED OCTOBER 13, 1879.

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No. 330.

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1 The President of the United States of America to John F. Barker, Charles N. Gilbert, and Elliott P. Gleason, greeting:

You are hereby commanded that you and each of you personally appear before the judges of the circuit court of the United States of America for the southern district of New York, in the second circuit court, in equity, on the first Monday of July, A. D. 1871, wherever the said court shall then be, to answer a bill of complaint exhibited against you in the said court by Theodore Clough, and to do further and receive what the said court shall have considered in that behalf. And this you are not to omit under the penalty on you, and each of you, of two hundred and fifty dollars.

Witness the Hon. Salmon P. Chase, Chief Justice of the Supreme Court of the United States, at the city of NewYork, on the 27th day of May, in the year one thousand eight hundred and seventy-one, and of the Independence of the United States of America the ninety-fifth.

KENNETH G. WHITE, *Clerk.*

YEAMON & HALL,
Compl't's Sol'rs.

The defendants are required to enter appearance in the above cause in the clerk's office of this court on or before the first Monday of July, 1871, or the bill will be taken pro confesso against them.

K. G. W., *Clerk.*

(Indorsed:) U. S. circuit court. Filed Sept. 23d, 1879.

2 United States circuit court for the southern district of New York. In equity.

THEODORE CLOUGH, PLAINTIFF,
against
CHARLES N. GILBERT AND ELLIOT P. GLEASON, defendants.

To the honorable the judges of the circuit court of the United States for the southern district of New York, sitting in chancery:

Theodore Clough, a resident of the county and city of New York, and a citizen of the State of New York, brings this his bill against John F. Barker, a resident of Springfield, Massachusetts, and a citizen of the State of Massachusetts, and Charles N. Gilbert and Elliot P. Gleason, residents of the city of New York, and citizens of the State of New York, the said John F. Baker and Charles N. Gilbert
3 doing business at Springfield, in the State of Massachusetts, and at the city of New York, in the State of New York, under the firm-name and style of The Gilbert and Barker Manufacturing Company.

And thereupon your orator complains and says that he is a citizen of the United States, and that at and before the granting of the letters patent and before the committing of the several grievances hereinafter mentioned he was the true, original, and first inventor of a certain new and useful improvement in gas-burners, not known or used before the plaintiff's invention or discovery thereof, and not at the time of his application for a patent in public use or on sale with his consent or allowance, and that thereupon he made applications to the Commissioner of Patents of the United States for letters patent for said invention and discovery.

4 And your orator further represents that having fully and in all respects complied with the requirements of law in that behalf, thereupon and afterwards, to wit, on the 14th day of June, 1870, letters patent of the United States, signed, sealed, and executed in due form of law, were made, issued, and delivered to your orator, bearing date the 14th day of June, 1870, and numbered 104271, granting to your orator, his executors, administrators, or assigns, for the term of seventeen years, the full and exclusive right and liberty of making, using, and vending to others to be used the said improvement, described in a schedule annexed to said letters patent and making a part thereof, as by reference to said letters patent and schedule annexed, and to which your orator for greater certainty craves leave to refer, will, among other things, more fully and at large appear. The
5 said letters patent were issued in the name of the United States of America, and were sealed with the seal of the Patent Office of the United States, and were signed by the Secretary of the Interior, and were countersigned by the Commissioner of Patents, and which said letters patent the plaintiff brings here into court, and refers thereto.

And thereupon, after the issual of the said letters patent, as aforesaid, your orator put the said invention into use, and made and used the said invention and improved gas-burner.

And your orator further shows that ever since the date of the said letters patent he has been, and now is, entitled to all the rights, interests, and privileges thereby secured unto him in and to the said
6 invention and discovery in the said letters patent particularly set forth, and ever since the date thereof has been entitled to the exclusive use of said invention and improvement; that the said invention or discovery so patented as aforesaid unto your orator is of *any* great utility; that the same has been extensively introduced into public use, and the public have generally acquiesced in his exclusive right to the same, and he would, but for the wrongful acts of the defendants and those acting in concert with them, have made large gains, profits, and advantages from the manufacture, use, and sale of said invention, and that by the said wrongful acts and doings he has been, and yet is, hindered from so doing.

And your orator further represents and charges that since the
7 issue of the said letters patent, and well knowing the premises and the rights and privileges secured unto your orator, and intending to infringe upon and to violate the exclusive rights of your orator under and by virtue of said letters patent, and to deprive him of his profits, benefits, and advantages which might and otherwise would have accrued to him, and without the license or permission of your orator, the defendants have at divers days and times since the 14th day of June, 1870, and within the term of years in said letters patent mentioned, and before the filing of this bill, been engaged in the city of New York and elsewhere, and within the jurisdiction of this honorable court, in making, using, and vending, and causing to be made, constructed, used, and vended, to sundry persons, said invention and improvement in gas-burners made according to the invention and improvement
8 secured and patented as aforesaid to your orator, and large numbers and quantities of combinations in mechanism wholly or in part the same gas-burner described in your orator's letters patent, said combination involving the inventions secured to your orator as aforesaid, and made in imitation of the invention and improvement, and in pursuance of the process and specifications protected by said letters

patent, none of said articles so used or vended by the defendants having been made by any person or persons authorized or licensed thereunto by your orator, and which unlawful making, using, and vending as aforesaid are flagrant violation and infringement of the exclusive rights and privileges secured to your orator under and by virtue of the letters patent aforesaid, whereby your orator has been greatly damaged, and *whereby your orator has been greatly damaged, and* whereby the said defendants have derived and received, and are still deriving and receiving, great gains and profits, but what quantity your orator does not know and cannot state, but believes them to be the full sum of $.

And your orator heretofore, to wit, on the day of , notified the defendants of his said patent and his rights thereunder, and requested them to desist from their said infringements and violation thereof, and yet they persist in said infringement and violation as aforesaid, and unless they are enjoined and restrained by this honorable court from further violation and infringement of his said letters patent, and from making, using, and vending to be used the said improvement in gas-burners, great and irreparable and damage will be done to your orator and his exclusive rights and privileges under his said patent, and all profits arising therefrom will be destroyed and rendered valueless to him.

To the end, therefore, that the said defendants may, if they can, show why your orator should not have the relief hereby prayed for, and may, upon their several and respective corporal oaths, and according to the best and utmost of their several and respective knowledge, remembrance, information, and belief, full, true, direct, and perfect answers make hereto, and to such of the several interrogatories hereinafter numbered and set forth as by the note hereunder written they are respectively required to answer, that is to say:

1. Whether letters patent for an improvement in gas-burners were not issued to your orator on the 14th June, 1870, and numbered 104271, as herein set forth?

2d. Whether said defendants have not, since the granting of said letters patent to your orator, used and practiced said improvement in gas-burners, or made and vended to be used imitations thereof, and mechanisms and mechanical combinations made substantially in accordance with the invention covered by said letters patent, and without any license or authority so to do?

3d. What amount, in numbers and value, of such gas-burners, and of imitations thereof, and of combinations in mechanisms made in accordance with said invention, they have sold or made for sale since the date of said letters patent, and the price received for them, and what profit has been made or derived therefrom by the said defendants, or by the use and practice in any form of said invention?

And your orator further prays that the defendants, John F. Barker, Charles N. Gilbert, and Eliot P. Gleason, and their agents, workmen, and attorneys may be restrained, by writ of injunction issuing out of and under the seal of this honorable court, from making, using, or vending to be used any article involving, or embracing, or constructed in pursuance of the invention secured to your orator by virtue of said letters patent, and from in any way using or putting in practice any invention covered or secured to your orator by the said letters patent, and from all violation and infringements of the exclusive rights secured to your orator under or by virtue of said

letters patent, and that at the final hearing in this court such injunction may be made perpetual.

And your orator further prays that the said defendants may be ordered and decreed to account for and pay to your orator all pro-
13 its realized by them from the use and practice of said invention covered and secured to your orator by the letters patent aforesaid, or from the sale of articles made in pursuance or in imitation of said invention, and all such gains and profits as your orator would have received but for the said unlawful acts and doings of the said defendants, and that your orator may have such other and further relief in the premises as the nature of the case may require, and as may be according to equity and good conscience.

And may it please your honors to grant your orator a writ of subpœna to be directed to said defendants, John F. Barker, Charles N. Gilbert, and Eliot P. Gleason, and commanding them at a certain day and under a certain penalty to be and appear before this honora-
14 ble court, and then and there full, true, and perfect answers to make to all and singular the premises, whether specially interrogated thereunto or not, and further to stand to, abide, and perform such further orders, directions, and decrees as to your honors shall seem meet and proper.

THEODORE CLOUGH,
Complainant.

YEAMAN HALL,
Solicitors for Complainant and of Counsel, 14 Wall st., New York.

UNITED STATES OF AMERICA,
Southern District of New York, ss:

On the 25th day of May, 1871, before me personally appeared the above Theodore Clough, who, being duly sworn, deposeth and saith that he is the complainant in the foregoing bill named, and has read the same and knows the contents thereof. That the said bill is true
15 of his own knowledge except as to those matters which are therein stated to be on his information and belief, and as to those he believes it to be true.

Sworn to before me this 25th day of May, 1871.

[NOTARIAL SEAL.] THOMAS H. BAROWSKY,
Notary Public, N. Y. Co.

NOTE.—The defendants, John F. Barker, Charles N. Gilbert, and Eliot P. Gleason, are required, each and severally, to answer the interrogatories numbered respectively 1, 2d, and 3d.

(Endorsed:) U. S. circuit court. Theodore C. Clough ag'st John F. Barker and others. Bill in equity. Yeaman & Hall, solicitor' for complainant, 14 Wall st., New York. Filed May 27, 1871.

16 Circuit court of the United States for the southern district of New York.

THEODORE CLOUGH
vs.
JOHN F. BARKER, CHARLES N. GILBERT, & Elliott P. Gleason.

The answer of John F. Barker and Charles N. Gilbert, two of the defendants to the bill of complaint of Theodore Clough, complainant.

These defendants, now and at all times hereafter saving and reserv-

ing unto themselves all benefit and advantage of exception which can or may be had or taken to the many errors, uncertainties, and other imperfections in the said complainant's said bill of complaint contained, for answer thereto, or to so much and such parts thereof as they
17 are advised is or are material or necessary for them to make answer unto, these defendants, for answering, say:

That they deny that the defendants Gilbert and Barker are copartners, or that they do business under the firm-name and style of Gilbert & Barker Manufacturing Company.

That they have been informed and admit it to be true that upon application by the complainant letters patent of the United States were granted and issued to the said Theodore Clough on the 14th day of of June, 1870, for an alleged improvement in gas-burners. And these defendants say that they do not know and are not informed save by said bill of complaint whether or not said Theodore Clough did properly make application for said patent, and did comply with all re-
18 quirements of law, and did have said patent issued to him in due form of law, and leaves the complainant to make such proof thereof as he shall be advised is material, but that complainant was the original or first inventor of said improved gas-burner, or that the same was not in public use or on sale with consent and allowance of either of the defendants more than two years before the complainant obtained his patent therefor, they do not admit, but upon information and belief deny, as is hereinafter more fully stated.

And these defendants, on information and belief, deny that by virtue of any such patent as is mentioned in said bill of complaint said complainant became or ever was possessed of or vested with any
19 exclusive right to use or make or sell, in the United States or elsewhere, the alleged invention.

And these defendants, further answering, deny that the said invention so patented to the said Theodore Clough is of great utility and value, or that the same has been extensively introduced into public use, or that the public have generally acquiesced in his exclusive right to the same.

And these defendants, further answering, and not admitting, but leaving the plaintiff to prove as he may be advised, the alleged value and profit to him of said invention, deny that he has been hindered or prevented by any wrongful act of these defendants, or by any act of either of them, from receiving the full value and profit from said invention.

20 And these defendants, further answering, deny that at the times mentioned in the bill of complaint, or at any time, they have, since the issuing of said patent, been engaged, at the city of New York or elsewhere, in making or issuing or vending, or causing to be made, constructed, used, or vended, said invention or improvement in gas-burners made according to the invention or improvement secured or patented to the complainant; and deny that during the times aforesaid they, or either of them, have been engaged in making, using, or vending, or causing to be made, constructed, used, or vended, large or any numbers or quantities of combinations in mechanism wholly or in part the same gas-burner described in the letters patent of complainant, or of any combinations involving the inventions secured to
21 the complainant as aforesaid, or which were imitations of the invention or improvement, or in pursuance of the process or specifications protected by said letters patent.

And these defendants further deny that they, or either of them, have,

either personally or as a member of any firm, been engaged either in the manufacture or sale of any "gas-burners" whatever, whether manufactured according to or in imitation of the plaintiff's alleged invention or otherwise; but say that the Gilbert and Barker Manufacturing Company, a corporation organized under the laws of the State of Massachusetts, and having its place of business in Springfield, in said State, of which corporation these respondents are officers, has, within the time mentioned in said bill of complaint, manufactured and sold certain improved gas-burners, but the same have been of a new
22 and peculiar construction, constituting a new and valuable improvement in gas-burners, and the subject of letters patent of the United States granted to John F. Barker, one of the defendants, dated the 26th day of July, 1870, and known as Barker's patent adjustable gas-burners; and these defendants deny that said gas-burners embrace in their construction and operation anything invented by the said Clough, or patented by him by his said letters patent, or that they are any imitation thereof; and also on their information and belief deny that these defendants, or either of them, or said corporation, by anything done in the manufacture and sale of gas-burners, have in any way interfered with the complainant's right, or infringed upon his letters patent.

And these defendants, further answering, say that if the said
23 letters patent be so construed as to embrace within the claim thereof the passing of gas through perforations at the base of the burner, in combination with the surrounding-tube, then the said letters patent are void, because they say the subject-matter thereof was known and used by others, and was patented and described in printed publications in the United States long before the patented invention thereof by the complainants, and was also in public use in the United States more than two years before the complainant's application for said patent, and with his consent and allowance; but these defendants submit that the said letters patent of the complainant, in view of the state of the art as it existed at the time of the com-
24 plainant's alleged invention, and which defendants asks leave to show in evidence, ought not to be so construed, and when rightly construed said letters patent do not embrace any gas burners made or sold by these defendants, or by the said Gilbert & Barker Manufacturing Company.

And these defendants, further answering, say that they are informed and believe it to be true that the bat-wing gas-burners, and also bat-wing gas-burners in combination with a surrounding-tube, and also bat-wing gas-burners perforated at the base in combination with the surrounding-tube, have been for many years prior to the alleged invention of the complainant well known and in public use in the United States.

25 That one Daniel H. Soliday, who resided in the city of Philadelphia, in the State of Pennsylvania, obtained letters patent of the United States, dated March 20, 1849, for a bat-wing burner with a ring band or tube of any kind, movable or stationary, and one F. Lunkenheim, of Cincinnati, Ohio, obtained letters patent of the United States, bearing date the 8th day of September, 1863, for a bat-wing gas-burner with perforated base tube or valve and surrounding-tube for the purpose of increasing or diminishing the flow of gas.

That one John B. Coolidge, residing in the city of Boston, in Massachusetts, obtained letters patent of the United States, dated Oct. 9, 1866, for a bat-wing gas-burner having a perforated base and a surrounding-tube.

That about February 3, 1866, Herman Berg and Andrew Blesing, both of Springfield, Massachusetts, filed in the Patent Office of the United States an application for a patent for a bat-wing gas-burner with aperforated base and a surrounding tube, which application was rejected and patent refused.

That about February 25, 1869, one Horace R. Barker, of Lowell, Massachusetts, filed in the Patent Office at Washington on application for a patent bat-wing burner with perforated base and surrounding tube, which application was rejected, and patent refused.

And these defendants, further answering, say that they are informed and believe it to be true that the substantial and material parts of the said invention and discovery patented by the letters patent mentioned in the bill of complaint aforesaid were mentioned and described in printed publications, that is to say, in the printed volumes of the Patent Office Reports of the United States, published at Washington by the government, of the several years when said patents above referred to bore date; and, also, in the Scientific American, published in the city of New York by Messrs. Munn & Co., all of which publications were published, issued, and publicly circulated and distributed prior to the supposed invention by Theodore Clough, the patentee aforesaid of the said alleged invention, the said description being on pages 644 of volume for the year 1863, and page 202 for the year 1849 & 1850, and page 1276 of volume 2 for the year 1866, and page 913 of vol. 2 for the year 1865 of said Patent Office Reports.

And these defendants, further answering, say that they are informed and believe it to be true that the said invention and discovery, and the same principal or substantial material parts thereof patented in and by the letters patent mentioned in the bill of complaint aforesaid was and were known to John B. Coolidge, of Boston, Massachusetts, and Henry Cooley, F. R. Carr, H. Q. Davis, Thomas Keating, L. M. Brown, A. J. Plumer, A. S. Twitchell, H. F. Briggs, all of Springfield, Massachusetts; also to all these defendants; also to William Russell, Horace R. Barker, Gore A. Hollowell, John Crane, James Norton, and A. W. Sherman, all of Lowell, Massachusetts; also to Ellwood Walter, of Englewood, New Jersey, and to F. Lenkenheim, of Cincinnati, Ohio, to all of whom said matters were known as early as January, 1869, and prior to the time when it is alleged in the bill of complaint aforesaid that the same was invented and discovered by Theodore Clough, patentee aforesaid.

And these defendants, further answering, say that they are informed and believe it to be true that substantial and material parts of said invention and discovery, and of the same principle and combination patented in and by the letters patent mentioned in the bill of complaint aforesaid, were in public use in the United States at Lowell, Massachusetts, by H. R. Barker & Co., and at Boston, Mass., by John B. Coolidge, and at Springfield, Massachusetts, by Berg & Blessing, the Springfield Gas Machine Co., Gilbert, Barker & Co., and the Gilbert & Barker Manufacturing Company, and at the city of New York by Gilbert & Barker, of New York City, as early as January, 1869, and had been in such use by some of said parties for more than two years before the 14th day of June, 1870.

And to the several special interrogatories these several answers severally, each for himself, as follows:

To the first he says that he is ignorant, and cannot say whether or not such letters patent were ever issued to the complainant.

To the second he says that he has not done any of the acts therein enquired of or mentioned.

31 To the third he saith that he has not made, sold, or received profit from the making or selling of any gas-burners described in said interrogatory.

Without this, that any other matter, cause, or thing in said complainant's bill contained material or necessary for these defendants to answer, and not herein and hereby well and sufficiently answered and confessed, avoided or denied, is true to the knowledge or belief of these defendants and each of them.

All of which matters and things these respondents are ready and willing to aver, maintain, and prove as this honorable court may direct; and they pray to be hence dismissed, with their costs.

STANLEY & BROWN,
Solicitor' for Defendants.

32 CITY & COUNTY OF NEW YORK:

John F. Barker, being by me duly sworn, says that he is one of the defendants above named; that he has read the foregoing answer, and that the same is true of his own knowledge, except as to the matters therein stated on information and belief, and as to those matters he believes it to be true.

JOHN F. BARKER.

Sworn to before me this 7th day of July, 1871.

MELVIN BROWN,
Notary Public N. Y. City & Co.

CITY & COUNTY OF NEW YORK, *ss:*

Charles N. Gilbert, being duly sworn, says he is one of the defendants above-named, & that the foregoing answer is true of his own knowledge, except as to those matters stated on information
33 & belief, and as to those matters he believes it to be true.

C. N. GILBERT.

Sworn to before me this 15th day of June, 1871.

THOMAS H. BAROWSKY,
Notary Public, N. Y. Co.

(Endorsed:) U. S. circuit court, southern dist. of N. Y. Theodore Clough vs. John F. Barker & others. Joint answer of def'ts Barker & Gilbert. Stanley & Brown, def'ts' sol'rs, 16 Wall st. Filed July 11, 1871.

34 Circuit court of the United States for the southern district of New York.

THEODORE CLOUGH,
against
JOHN F. BARKER, CHARLES N. GILBERT, AND Elliott P. Gleason.

To the honorable judges of the circuit court of the United States for the southern district of New York, in chancery sitting:

Humbly complaining, showeth unto your honors, your orator, Theodore Clough, of the county and city of New York, that on or about the 27th day of May, 1871, your orator exhibited his original bill of com-

plaint in this honorable court against the defendants hereto, and the said defendants being duly served with process appeared and put in their answers to said original bill.

I. And your orator further states, by way of amendment, that he has discovered since the filing of said answers that the Gilbert &
35 Barker Manufacturing Company of Springfield, Massachusetts, is a necessary party defendant to this action.

II. And your orator further shows that the defendant John F. Barker is a member and corporator of the Gilbert & Barker Manufacturing Company and treasurer thereof, and has been since the 7th day of March, 1870; and the defendant Charles N. Gilbert is a member and corporator of said Gilbert & Barker Manufacturing Company and general agent thereof, and has been since the 7th day of March, 1870, and the defendants Barker & Gilbert are the only members of said company known to your orator, and they now are, and have been since the organization of said company, acting in their respective capacities as treasurer and agent, under the authority, by the direction, and in behalf of said company, in the management and conduct of its business, which is the manufacture and sale of gas-fixtures and gas-burners; and the said defendant the Gilbert & Barker Manufacturing Company, since the issue of plaintiff's patent, and well knowing the premises and the rights and privileges secured unto your orator, and intending to infringe upon and to violate the exclusive rights of your orator under and by virtue of said letters patent, and to deprive him of the benefits and advantages which might and otherwise would have accrued to him, and without the license or permission of your orator, have at divers days and times since the 14th day of June, 1870, and within the term of years in said letters patent mentioned, and before the filing of plaintiff's original bill, been engaged, in the city of New York and elsewhere, and within the jurisdiction of this honorable court, in making, using, and vending, and causing to be made, constructed, used, and vended to sundry persons, said invention and improvement secured and patented as aforesaid to your orator, and large numbers and quantities of combinations in mechanism wholly or in part the same gas-burner described
36 in your orator's letters patent, said combinations involving the invention secured to your orator as aforesaid, and made in imitation of the invention and improvement, and in pursuance of the process and specifications protected by said letters patent, none of said articles so used or vended by the defendants having been made by any person or persons authorized or licensed thereunto by your orator, and which unlawful making, using, and vending as aforesaid are in flagrant violation and infringement of the exclusive rights and privileges secured to your orator under and by virtue of the letters patent aforesaid, whereby your orator has been greatly damaged, and whereby the said defendants have derived and received, and are still deriving and receiving, great gains and profits, but what quantity your orator does not know and cannot state, but believes them to be the full sum of $10,000.00.

III. Wherefore your orator prays that the said Gilbert & Barker Manufacturing Company be made a party defendant to this suit, and be required to answer plaintiff's original bill and this amended bill, and that your orator have against the said company all the relief prayed for, and such other and further relief as the nature of this case may require.

THEODORE CLOUGH.

YEAMAN & HALL,
Solicitors for Complainant and of Counsel.

UNITED STATES OF AMERICA,
Southern District of New York, ss:

On this 31st day of August, 1871, before me personally came and appeared the above Theodore Clough, who, being duly sworn, deposeth and saith that he is the complainant in the foregoing amended bill named, and has read the same and knows the contents thereof;
37 that the said amended bill is true of his own knowledge, except as to those matters which are therein stated to be on his own information and belief, and as to those matters he believes it to be true.

THEODORE CLOUGH.

Sworn to before me this 31st day of August, 1871.

FRANK J. DUPIGNAC,
Notary Public, N. Y. Co.

GENTLEMEN: The foregoing is a copy of the amended bill this day filed in this case; the words "and the Gilbert & Barker Manufacturing Company" to be inserted and read in and as of the original bill in the title thereof, immediately following the name "Gleason," and in the order in the body and prayer of the original bill wherever the defendants are named and enumerated. The additional allegation and paragraph numbered II to be inserted and read in and as of the original bill immediately following the words "the full sum of $." The additional prayer and paragraph numbered III to be inserted and read in and as of the original bill immediately after the words "good conscience."

YEAMAN & HALL,
Solicitors for Plaintiff.

To Messrs. STANLEY & BROWN,
Solicitors for Def'ts.

38 Circuit court of the United States for the southern district of New York.

THEODORE CLOUGH
vs.
JOHN F. BARKER, CHARLES N. GILBERT, AND The Gilbert & Barker Manufacturing Company.

The amended answer of John F. Barker and Charles N. Gilbert, and the answer of the Gilbert & Barker Manufacturing Company, the defendants, to the amended bill of complaint of Theodore Clough, complainant.

These defendants, now and at all times hereafter saving and reserving unto themselves all benefit and advantage of exception which can or may be had or taken to the many errors, uncertainties, and other imperfections in the said complainant's said bill of complaint contained, for answer thereto, or to so much and such parts thereof as these defendants are advised are material or necessary for them to make answer unto, say:

That they deny that the defendants Gilbert & Barker are copartners, or that they do business under the firm-name and style of the Gilbert & Barker Manufacturing Company. And they admit that the Gilbert & Barker Manufacturing Company is a corporation duly organized

under the laws of Massachusetts; that defendants Gilbert and Barker are officers thereof.

That defendants have been informed, and admit it to be true, that, upon application by the complainant, letters patent of the United States were granted and issued to the said Theodore Clough on the 14th
39 day of June, 1870, for an alleged improvement in gas-burners.

And defendants say that they do not know and are not informed, save by said bill of complaint, whether or not said Theodore Clough did properly make application for said patent, and did comply with all requirements of law, and have said patent issued to him in due form of law, and leave the complainant to make such proof thereof as he shall be advised is material; but that the complainant was the original or first inventor of said improved gas-burner, or that the same was not in public use or on sale with his consent and allowance more than two years before the complainant obtained his patent therefor, defendants do not admit, but upon information and belief deny, as is hereinafter more fully stated.

And defendants, on information and belief, deny that, by virtue of any such patent as is mentioned in said bill of complaint, said complainant became or ever was possessed of or vested with any exclusive right to use or make or sell, in the United States or elsewhere, the alleged invention, except as hereinafter expressly admitted.

And these defendants, further answering, deny that the said invention so patented to the said Theodore Clough is of great utility and value, or that the same has been extensively introduced into public use, or that the public have generally acquiesced in his exclusive right to the same.

And defendants, further answering, and not admitting, but leaving the plaintiff to prove as he may be advised, the alleged value and profit to him of said invention, denies that he has been hindered or prevented by any wrongful act of these defendants, or by any act of theirs, from receiving the full value and profit from said invention.

And defendants, further answering, deny that at the times mentioned in the bill of complaint, or at any time since the issuing of said patent, defendants, or either of them, have been engaged, at the city of
40 New York or elsewhere, in making or using or vending, or causing to be made, constructed, used, or vended, said invention or improvement in gas-burners made according to the alleged invention or improvement secured or patented to the complainant, except as herein expressly admitted; and deny that during the times aforesaid they, or either of them, have been engaged in making, using, or vending, or causing to be made, constructed, used, or vended, large or any numbers or quantities of combinations in mechanism wholly or part the same gas-burner described in the letters patent of complainant, or of any combinations involving the invention secured to the complainant as aforesaid, or which were imitations of the invention or improvement, or in pursuance of the process or specifications protected by said letters patent.

Defendants admit that the Gilbert & Barker Manufacturing Company, a corporation organized under the laws of Massachusetts, and having its place of business at Springfield, in said State, has, within the time mentioned in said bill of complaint, manufactured and sold certain improved gas-burners, but the same have been of a new and particular construction, constituting a new and valuable improvement in gas-burners, and the subject of letters patent of the United States granted to John F. Barker, one of the defendants, dated the 26th day

of July, 1870, and known as Barker's patent adjustable gas-burner. And these defendants deny that said gas-burners embrace in their construction and operation anything invented by the said Clough, or patented to him by his said letters patent, or that they are any imitation thereof, and also, on information and belief, deny that these defendants, or either of them, by anything done in the manufacture or sale of gas-burners, have in any way interfered with the complainant's rights or infringed upon his letters patent.

41 And defendants, further answering, say that if the said letters patent be so construed as to embrace within the claim thereof the passing of gas through perforations at the base of the burner in combination with the surrounding-tube, then the said letters patent are void, because he says the subject-matter thereof was known and used by others, and was patented and described in printed publications in the United States long before the time of the patented invention thereof by the complainant, and was also in public use in the United States more than two years before the complainant's application for said patent, and with his consent and allowance; but these defendants submit that the said letters patent of the complainant, in view of the state of the art as it existed at the time of complainant's alleged invention, and which defendants ask leave to show in evidence, ought not to be so construed, and, when rightly construed, said letters patent do not embrace any gas-burner made or sold by defendants, or either of them.

And defendants, further answering, say that they are informed and believe it to be true that bat-wing gas-burners, and also bat-wing gas-burners in combination with a surrounding-tube, and also bat-wing gas-burners perforated at the base, in combination with a surrounding-tube, have been for many years prior to the alleged invention of the complainant well known and in public use in the United States. That one Daniel H. Soliday, who resided in the city of Philadelphia, in the State of Pennsylvania, obtained letters patent of the United States, dated March 20th, 1849, for a certain arrangement of a bat-wing burner with a ring, band, or tube, and movable or stationary. That one F. Lunkenheim, of Cincinnati, Ohio, obtained letters patent of the United States, bearing date the 8th day of September, 1863, for a certain arrangement of a bat-wing gas-burner with perforated base, tubular valve, and surrounding-tube, for the purpose of increasing or diminishing the flow of gas.

42 That one John B. Coolidge, residing in the city of Boston, in Massachusetts, obtained letters patent of the United States, dated October 9th, 1866, for a certain arrangement of a bat-wing gas-burner, having a perforated base and a surrounding-tube.

That about February 3d, 1866, Herman Berg and Andrew Blessing, both of Springfield, Massachusetts, filed in the Patent Office of the United States an application for a patent for a bat-wing gas-burner with a perforated base and a surrounding-tube, which application was rejected and patent refused.

And these defendants, further answering, say that they are informed, and believe it to be true, that the substantial and material parts of the said invention or discovery patented by the letters patent mentioned in the bill of complaint aforesaid were mentioned and described in printed publications, that is to say, in the printed volumes of the Patent Office Reports of the United States, published at Washington by the government, for the several years when said patents above referred to bore date, and also in the Scientific American, published in the city of

New York by Messrs. Munn & Co., all of which publications were published, issued, and publicly circulated and distributed prior to the supposed invention by Theodore Clough, the patentee aforesaid of the said alleged invention, discovery, principle and combination, the said description being on pages 644 of vol. 1 for the year 1863, and page 202 for the years 1849 and 1850, and page 1276 of vol. 2 for the year 1866, and page 913 of vol. 2 for the year 1865 of said Patent Office Reports.

And defendants, further answering, say that they are informed, and believe it to be true, that the said invention and discovery, and the same principle or substantial and material parts thereof, patented in and by the letters patent mentioned in the bill of complaint aforesaid, were known to John B. Coolidge, of Boston, Massachusetts, and Henry Cooley, F. R. Carr, H. Q. Davis, Thomas Keating, L. M. Brown,
43 A. J. Plumer, A. S. Twitchell, H. F. Briggs, all of Springfield, Massachusetts; also to all these defendants; also to William Russell, Horace R. Barker, D. Gove, A. Hallowell, John Crane, James Norton, and A. W. Sherman, all of Lowell, Massachusetts; also to Ellwood Walter, of Englewood, New Jersey, and to F. Lunkenheim, of Cincinnati, Ohio, to all of whom said matters were known as early as January, 1869, and prior to the time when it is alleged in the bill of complaint aforesaid that the same was invented and discovered by Theodore Clough, patentee aforesaid.

And defendants, further answering, say that they are informed, and believe it to be true, that substantial and material parts of said invention and discovery of the same principle and combination patented in and by the letters patent mentioned in the bill of complaint aforesaid were in public use in the United States at Lowell, Massachusetts, by H. R. Barker & Co., and at Boston, Massachusetts, by John B. Coolidge, and at Springfield, Massachusetts, by Berg & Blessing, the Springfield Gas Machine Co., Gilbert, Barker & Co., and the Gilbert & Barker Manufacturing Company, and at the city of New York by Gilbert & Barker, of New York City, as early as January, 1869, and had been in such use by some of said parties for more than two years before the 14th day of June, 1870.

And the defendants deny that they or either of them have infringed upon any patent of the plaintiff.

And to the several special interrogatories defendants answer as follows:

To the first they say that they are ignorant and cannot say whether or not such letters patent were ever issued to the complainant.

To the second they say that neither of the defendants have done any of the acts therein inquired of or mentioned.

To the third they say that neither of the defendants have made, sold, or secured profit from the making or selling of any gas-burners described in said interrogatory; without this, that any other mat-
44 ter, cause, or thing in said complainant's bill contained material or necessary for these respondents to answer, and not herein and hereby well and sufficiently answered and confessed, avoided or denied, is true to the knowledge or belief of these respondents. All of which matters and things these respondents are ready and willing to aver, maintain, and prove as this honorable court may direct, and they pray to be hence dismissed with their costs.

STANLEY & BROWN,
Defendants' Solicitors, 16 *Wall Street*.

CITY AND COUNTY OF NEW YORK, *ss:*

Charles N. Gilbert, being duly sworn, says that he is one of the defendants in this action; that he has read the foregoing answer, and that the same is true of his own knowledge, except as to those matters therein stated on information and belief, and as to those matters he believes it to be true.

C. N. GILBERT.

Sworn to before me this 18th day of November, 1871.

MELVIN BROWN,
Notary Public, N. Y. City and County.

45 Circuit court of the United States for the southern district of New York.

THEODORE CLOUGH, COMPLAINANT,
ag'st
JOHN F. BARKER, CHARLES N. GILBERT, AND The Gilbert & Barker Manufacturing Company, defendants.

The replication of Theodore Clough, complainant, to the amended answer of John F. Barker and Charles N. Gilbert, and the answer of the Gilbert & Barker Manufacturing Company, to complainant's original and amended bills.

This repliant, saving and reserving to himself all and all manner of advantage of exception which may be had and taken to the manifold errors, uncertainties, and insufficiencies of the answer of the said defendants, for replication thereunto saith that he doth and will aver, maintain, and prove his said bill to be true, certain, and sufficient in the law to be answered unto by the said defendants, and that the answer of the said defendants is very uncertain, evasive, and insufficient in the law to be replied unto by this repliant; without that, that any other matter or thing in the said answer contained material or effectual in the law to be replied unto, and not herein and hereby well and sufficiently replied unto, confessed or avoided, traversed or denied, is true; all which matters and things this repliant is ready to aver, maintain,
46 and prove as this honorable court shall direct, and humbly prays as in and by his said bill he hath already prayed.

YEAMAN & HALL,
Solicitors for Complainant, 14 Wall street, N. Y.

Circuit court of the United States for the southern district of New York.

THEODORE CLOUGH, COMPLAINANT,
against
JOHN F. BARKER, CHARLES N. GILBERT, and The Gilbert & Barker Manufacturing Company, defendants.

Exceptions taken by the said complainant to the joint answer of the said defendants to his bill and amended bill of complaint in this cause.

FIRST EXCEPTION.—For that the said defendants have not, according to the best of their knowledge, information, and belief, answered, set

forth, and discovered how many gas-burners they have made in the manner and form alleged in the complaint, nor the value thereof, nor how many according and pursuant to the alleged patent to the defendant Barker, nor the value thereof, and have not sufficiently stated
47 and explained the construction of the gas-burners admitted and stated by them to have been made according to the said Barker's patent.

SECOND EXCEPTION.—For that the said defendants have not, according to the best of their knowledge, information, and belief, answered, set forth, and discovered the authority and agency of the defendants Barker and Gilbert in behalf of the defendant the Gilbert & Barker Manufacturing Company and their action in behalf of said company, as alleged in the complaint.

YEAMAN & HALL,
Solicitors for Complainant.

Circuit court of the United States for the southern district of New York.

At a special term of the circuit court of the United States of America for the southern district of New York, held at the United States court-rooms, in the city of New York, on the day of , 1871.

Present, the honorable Samuel Blatchford, district judge.

THEODORE CLOUGH, COMPLAINANT,
against
JOHN F. BARKER, CHARLES N. GILBERT, and Elliott P. Gleason, defendants.

48 Whereas by articles of agreement bearing date the 24th day of August, 1871, it is recited and agreed as follows:

It is hereby agreed and stipulated by and between the parties, the defendant Barker acting for himself and as treasurer of the Gilbert & Barker Manufacturing Company, and the defendant Gilbert for himself and as general agent of said company, that the plaintiff's motion herein for a preliminary injunction will be withdrawn without prejudice to his prayer for a final or perpetual injunction or to other relief demanded in his bill.

That he will amend his bill making said Gilbert & Barker Manufacturing Company a defendant, and in such other particulars as the court may grant him permission; that said amendment shall be tendered and filed at the special term of this court, to be held on the 30th inst., and may be made by interlineation and insertion, a copy being served on defendants' solicitors; and then, on the 30th inst., the said Gilbert & Barker Manufacturing Company will enter its appearance to complainant's bill and amended bill herein.

That the plaintiff and defendants will, by their counsel, unite in a motion or demand for a trial at law of the issues herein by a jury at the next regular term of this court.

That an order of court, based on this agreement and carrying it into effect, may be made and entered at said special term, on the 30th inst.

If for any cause the court declines to make an order carrying this agreement into effect in all its parts, then it becomes mutually abrogated and of no effect in all of its parts.

STANLEY & BROWN,
Solicitors for Defendants.
YEAMAN & HALL,
Solicitors for Complainant.

Dated 24th August, 1871.

49 Now, upon motion of Mr. Yeaman, of counsel for complainant, and upon producing one part of said articles under the respective hands of Messrs. Yeaman & Hall, solicitors for complainant, and Messrs. Stanley & Brown, solicitors for defendants, and praying that the same may be made an order of this court, it is ordered that the said agreement be made an order of this court, to be observed and performed by the parties hereto according to the tenor and true meaning thereof, Mr. Stanley, of counsel for the defendants and for the Gilbert & Barker Manufacturing Company consenting thereto.

On motion of Mr. Yeaman, of counsel for plaintiff, it is ordered that plaintiff's motion for a preliminary injunction be withdrawn, without prejudice to his prayer for final and perpetual injunction or to other relief demanded in his bill.

And a motion having been made in this cause on the part of the complainant to amend his original bill by making the Gilbert & Barker Manufacturing Company a party defendant hereto, the said proposed amendment being first shown to the court, it is ordered that the plaintiff have liberty to make and file the same in manner and form as agreed by the solicitors for the parties respectively. Whereupon, the said amended bill having been filed, Mr. Stanley, of counsel for defendant the Gilbert & Barker Manufacturing Company therein named, entered the appearance of said Gilbert & Barker Manufacturing Company to the original and amended bills of the plaintiff.

And motions having been made in this cause on the part both of the plaintiffs and the defendants for a feigned issue to try the validity of the complainant's patent for an improvement in gas-burners, issued on the 14th day of June, 1870, and numbered 104271, and to try the other issues raised by the pleadings in this cause, it is hereby ordered that a feigned issue be granted, and that the following questions be tried
50 at law at the next circuit court of the United States, to be held at the United States court-rooms, in the city of New York, in the said district, that is to say:

First. Whether or not the complainant is the first and original inventor of the improvement in gas-burners for which the first above-named patent has been granted to him?

Second. Whether or not the gas-burners manufactured by the defendants are substantially identical with those described in the complainant's patent and schedule thereto annexed, in their construction and mode of operation?

And it is further ordered that the defendant the Gilbert & Barker Manufacturing Company have thirty days to file its answer to the bill and amended bill of complainant.

And it is further ordered that the defendants give the same notice of the defense on the trial of the above issue at law, and within the same time that would be required if the trial was in an action at law.

And on motion of plaintiff, his bill is dismissed, without prejudice, as to the defendant Elliott P. Gleason.

(Signed) SAM'L B. BLATCHFORD.

51 United States circuit court for the southern district of New York, in the second circuit.

THEODORE CLOUGH
vs.
JOHN F. BARKER, CHARLES N. GILBERT, AND The Gilbert & Barker Manufacturing Company. } Case and exceptions.

This cause coming on in its order on the calendar, upon the pleadings

and issues framed therein, to be tried before the Hon. Nathaniel Shipman and a jury, the counsel for the complainants, to sustain the issues on his part, read in evidence the letters patent issued to Theodore Clough, dated the 14th day of June, 1870, with the specifications and drawings thereto annexed, a copy of which is hereto annexed and marked Exhibit I, as the burners are marked A, B, and C.

The complainant's counsel then read a certified transcript from the United States Patent Office, stated to be from the files of the office, in the matter of the letters patent granted to Theodore Clough, dated June 14th, 1870, 104271, II.

The complainant's counsel then called as a witness THEODORE CLOUGH, who, having been duly sworn, testified as follows:

52 Q. You are the complainant in this case?

A. I am, sir.

Q. Where do you live?

A. In New York.

Q. What is your business?

A. Manufacturer of gas-burners.

Q. How long have you been engaged in manufacturing gas-burners?

A. I should say about three years.

Q. When was your attention first directed to the subject of inventing gas-burners for the purpose of burning this gasoline or air-gas?

A. I should say a great many years ago, dating further back than these patents.

Q. These efforts resulted in your application for the present patent?

A. Yes, sir.

Q. Look at these specimens, and tell the jury if they are made in accordance with the specifications and claim in your patent.

(Objected to until the specifications have been read.

Specifications read.

Objection renewed on the ground that an inspection and comparison of the burners with the specifications shows that the burners A and B produced are not the burners described in the complainant's patent and specifications.)

The COURT. You can go on and describe your exhibits, and tell the jury whether they are the patented article or not.

(Defendants' counsel excepted to the ruling.)

Q. Those Exhibits A and B are the articles for which your patent is taken out, are they not?

53 A. Yes, sir; and a subsequent article to that upon which I obtained the patent; are the same; that is the one that Mr. Stanley has; that sample there, Ex. C, is the original patent; those Exhibits A and B were a subsequent article which contains that patent; I supposed I had a perfect right to make it.

Q. (By Mr. STANLEY.) The question was whether these others, Exhibits A and B, were described in the patent?

A. The patent describes all of them—the drawings do, I believe.

Q. What was the defect in the gas-burner, in the bat-wing burner, which you intended to remedy by this invention?

A. The idea was to burn a poor or a rich gas, which we had never been able to burn before.

Q. What was the difficulty experienced with the bat-wing burner in attempting to burn this air-gas or gasoline?

A. The difficulty was that the first end of the gas would smoke, and the last end you could not get anything through the burners at all.

Q. Has your invention obviated these difficulties?

A. Yes, sir.

Q. Have you ever seen or heard of any gas-burners like these you have patented before you invented it and made an examination?

A. No, sir; nothing but the plain, solid burner.

Q. So far as you know or believe, you are and was the original inventor of that burner as patented by you?

A. I believe I was.

Q. You have said you are a maker of gas-burners now?

A. Yes, sir.

Q. You have men in your employ, have you?

A. I have.

Q. State to the jury whether a competent mechanic, skilled in this kind of work, can make your burners by following the specifications in your patent.

54 A. Yes, sir; he can; certainly.

Q. Will you explain to the jury the difference between your burner and the small bat-wing burner as formerly used?

A. The gas-machines formerly used to burn air-gas had a solid burner, and could only burn a very rich gas; I got up this burner, Ex. C, with a fine slot, so that when that was shut up—this opening—it shut off the air; that would burn very rich gas; and when the gas deteriorated—became very poor—they could open this, and supply it by a passage connected with this slot, through this tube, and that I patented, the slot only giving shape to the flame, and this outside tube giving illuminosity. You can screw it up altogether, if desired, and cut off the flame by this valve, or you can decrease it by unscrewing this valve. But the slot always remains the same, simply giving the shape, the outside giving it illuminosity. You merely turn this round, which is fastened stationary on the fixture. As you take hold of this and give it a turn, that opens those perforations, and carries the gas on the outside, while before they had thought there was no check on that; that it would smoke, and there would be a certain time it would give a very good light, and then be bad. This burner thoroughly obviates that. By this you can turn it up and regulate it.

Q. Will you tell the jury wherein these other burners, Ex's A and B, that you say you have made in accordance with your patent, differ, or whether they are the same as the one you have just described?

A. There is a surrounding-tube, perforated at the base. I contend that I have a right to make a burner in any form I choose. It is regulated by opening and closing this valve, as I do with this. That screws right down and forms a valve.

Q. You say that in your experience in the gas business you had never seen or heard of this burner until you invented it?

A. No, sir.

55 Q. What did you do after you obtained your patent; did you introduce the burners into use?

A. Before I obtained my patent I made some five to six gross of these burners.

Q. After your application for the patent was pending?

A. Yes, sir; and I called on these gentlemen, Gilbert and Barker, to try and solicit their trade for this burner—to make them the agents of this burner—and I left a burner with Mr. Gilbert, one of the firm, as a sample. He said he would send it to Springfield and have it tested, and get their report of it. I called there several times afterwards, but

never saw Mr. Gilbert, and never heard anything of it. About the first that I heard of it was Gilbert & Barker had a burner of their own.

Q. When and where did you first see the burner which they had got out, or were making?

A. I believe I heard of it from Mr. Gleason.

Q. Who was Mr. Gleason?

A. He was a large manufacturer of gas-burners.

Q. Did he act as their agent in selling them?

A. I don't know; I rather think he did; I could not say positively.

Q. You then commenced the manufacture of your burners yourself?

A. Not for some time afterwards; it was a long time 'fore I disposed of them five or six gross that I made in the country, and I had other burners to attend to; and I wanted to work up this patent to see whether a business could be made out of it. I was not certain then whether a business could be made out of it alone, by itself.

Q. You wanted to see if some of the gas men would take hold of it?

A. I wanted to see if some of our largest manufacturers of gas-burners would give me some encouragement about it.

Q. When did you first commence the manufacturing for sale on your own account?

56 A. That was some time after the issuing of the patent; I should say, well, two or three months.

Q. Were you or not delayed in your operations going into manufacturing by the want of capital?

A. Yes; I was.

Q. You have seen these burners made by you in operation, have you not?

A. Yes, sir.

Q. State to the jury whether or not they effect the object claimed by your patent to be effected.

A. They do, very perfectly; and they accomplish something that the gas-machine men acknowledge never was done before.

Q. You are still the owner of this patent?

A. Yes, sir.

Q. Have you parted with the whole of it, or any part of it?

A. No, sir.

Q. Look at these two burners and say when and how they came into your possession.

A. I think I obtained those of the Gilbert & Barker Manufacturing Company myself.

Q. In Massachusetts, or in their establishment in this city?

A. In this city. I went around there and took my patent there, and told them they were infringing the patent, and I wanted them to stop it. I saw the clerk there, and he made a note of it, and said that Mr. Barker or Mr. Gilbert would not wish to do anything that was wrong. If they were infringing my patent they would stop it.

Q. Was that before the beginning of this suit?

A. Oh, yes, sir.

Q. (Handing samples to witness.) Will you describe these to the jury, and if there is any material difference in the structure, the mode of operation, or the result to be produced, just take it and show the jury what the difference is?

57 (Witness exhibits the two sets of burners to the jury, and describes them, and states that in construction, mode of operation, and results produced they are practically and substantially the same.

Both sets offered in evidence. Complainant's burners marked A, B, and C.

Barker's burners marked D and E, and hereto attached.

Defendants' counsel objects to admission of A and B; the court overruled the objection; and defendants' counsel excepted.)

Q. At this establishment of the defendants, at the city of New York, where you obtained these burners, did they have burners of the same kind there on sale?

A. Yes, sir; they had large quantities of those burners that were last shown—the Springfield burner.

Q. Have you ever been in their manufactory at Springfield?

A. No.

Q. Have you ever seen any of their gas-machines in operation?

A. I don't think I ever have.

Q. At the time you made the application for this patent, were there any burners like this on sale or in use with your permission?

A. No, sir.

Q. At this establishment of the defendants in the city of New York do they only sell these burners, or do they make also?

A. They only sell, I believe, the burners they make at Springfield.

Q. What is there in that establishment to indicate what it belongs to; are there any signs there?

A. It is called the Gilbert & Barker Manufacturing Company.

Q. Is there such a sign as that over the door?

A. There is now in their present place of business.

58 Cross-examined by Mr. STANLEY:

Q. How long have you been in the gas-burner business?

A. About three years.

Q. What did you do prior to that time?

A. I was engaged in the manufacture of gasoline oil, petroleum, for a number of years.

Q. Your first connection then with the gas-burner business was about 1870, you say?

A. A little while before that I should say.

Q. Were you in business for yourself, or with some one else?

A. I would add that I spent about six months in the country experimenting on this burner before I got it so that I could apply for a patent—so that I could make it fit to show anybody; when I got it so that I thought that I could show it to a gas-machine man, I brought it down to New York and showed it to Mr. Nash.

Q. Where was this that you were in the country?

A. Dobb's Ferry.

Q. And what six months was it—what year?

A. In 1869 I should say.

Q. You obtained your patent when?

A. In 1870.

Q. In what month in 1870; it was in June was it?

A. June 14th.

Q. Between these six months in 1869, and June, 1870, what were you doing?

A. As I say, I had been following the kerosene-oil business.

Q. Was it not in the early part of 1870, prior to June, 1870, that you were at Dobb's Ferry at work at the burners?

A. I lived there.

Q. It was during the first six months, before you obtained your patent, that you were at work at Dobb's Ferry?

59 A. It was before that; the petition ran some time before I got the patent.

Q. As I understand you, you never made any gas-burners by the old model, and you were not in the business at all before you devoted yourself to making a burner for this gasoline gas?

A. Yes, sir.

Q. Have you the original burner that you made with you?

A. The first experimental burner?

Q. The first one that you completed.

A. The first experiment you mean?

Q. Yes.

A. I believe it is there—that is the one.

Q. This is not the one you finally patented?

A. No, sir, it was an experiment.

Q. In your patent you described a burner in which you say Figure 1 describes the elevation, Figure 2 the burner-tube; then you refer to Figure 3 and Figure 4; then to letters A, B, C, D, and E; and letter E you say, the tubular valve, extends up into the burner-tube, operated by an annular screw at the lower end; won't you show to the jury the tubular valve in these burners which you describe in your patent, extending up into the interior of the burner-tube?

A. There is the spindle of the valve; of course that slides on it into that hole there, and shuts up these perforations; this is Exhibit C.

Q. And this tubular valve strikes a socket just above these perforations, does it not, when it is screwed up, and shuts off the gas there which came round through this surrounding-tube?

A. Yes, sir.

Q. When it strikes that the gas comes out of this tip, does it not?

A. Yes, when it is clear up.

Q. (By the COURT.) Comes right up towards the slot and makes one solid tube, these orifices being closed?

A. Yes.

60 Q. When it so screwed up?

A. Yes.

Q. Then it is nothing but an ordinary burner-tube?

A. Yes, sir.

Q. That is what you refer to by the letter E in your specifications?

A. Yes, sir.

Q. Suppose you take out that tubular valve entirely, what is the effect in the use of this burner for gasoline gas?

A. That makes what we call a gasoline-burner.

Q. What is the effect if you take out that tubular valve, and leave the other parts?

A. It will make a much larger quantity probably—a larger quantity might run outside the tube than might be necessary.

Q. You could not regulate it at all without it?

A. Not without that.

Q. It would be useless as a burner for gasoline gas, would it not?

A. No, sir; it would be practicable to burn it with that away.

Q. You could not regulate it?

A. No, except by putting the perforations in it to suit.

Q. You put the perforations in the tube, and then you have a fixed supply of gas; you could not increase or diminish it?

A. No.

Q. What is the improvement on the old way of constructing a tube of that description; I mean omitting this tubular valve?

A. In the first place it makes the light very steady, and makes a more constant pressure, and makes the gasoline gas burn more like coal gas.

Q. Have you any machines for using gasoline gas that use any such burner as that which you have described?

61 A. I have one machine; am making lots of the burners and selling them myself to the Maxim Gas Company.

Q. Do they make gasoline gas?

A. Yes, sir.

Q. Have you described in your specifications the gas-burner which you consider you have invented?

A. I believe I have.

Q. You said there never was a burner for burning gasoline gas, which was a regulating gas-burner, prior to your invention?

A. Yes, sir; I never knew of anything of the kind; I have seen burners afterwards.

Redirect:

Q. This gas-burner which Mr. Stanley had with you before the jury—the object of this tubular valve is for the purpose of being screwed up or down, so as to open or shut these perforations at the bottom of the burner, is it not?

A. Yes, sir.

Q. The gas travels up between that and the annular ring, and operates in the same way as it does in these other burners, merely according to your patent?

A. Yes, sir; they are the same.

Q. Now, in this other burner the perforations at the base, which are for the purpose of letting it come up between the burner and the annular ring, are in the shell here, and are enclosed by screwing up and down this annular, which operates in the same way as a valve—opened or closed?

A. Yes.

Q. Did you say that when you went up to see these defendants, or their agent, you showed them a model of your intended patent?

A. I took the patent up there, and gave them a burner, to try and solicit their trade.

Q. Had you not seen them in regard to it before your patent was obtained, or while your application was pending?

62 A. Yes.

Q. What did you show them then?

A. I gave them a burner.

Q. You stated you intended to have it patented?

A. Yes, sir.

Recross:

Q. To whom was it that you gave that burner?

A. I believe to Mr. Gilbert; after I made an application for a patent I went and gave the parties a sample burner, you may call it.

Q. And about what time was that?

A. It was about two months, I should say, prior to July 14th.

Q. And that sample burner was a burner made in accordance with the specification in your patent?

A. Yes.

Q. With an interior tubular valve?

A. Yes.

Q. You went there afterwards and saw the clerk?

A. I could not say as to who it was I saw there; it was after the patent was issued and they had got their burner.

Q. Which of these exhibits in evidence do you make?

A. I make all of them—both the surrounding-tube and perforated at the base.

Q. Which of them do you now make?

A. I don't make either one of them now.

Q. Which of these A, B, and C?

A. There is none of them made now.

Q. Have you ever made them for use?

A. Yes, sir.

Q. Why do you not make them now?

A. Because I have got a burner that I can make for less money on another improved patent.

Q. You found these too expensive, didn't you, to manufacture?

63 A. No; I experimented to make an improvement on them.

Q. You did improve on them?

A. Yes; I made an improvement whereby I cheapened the manufacture.

Q. And obtained a new patent?

A. Yes, sir.

GEORGE H. KITCHEN, called by plaintiffs, being duly sworn, testifies as follows:

Q. Where do you live?

A. Whitestone, Long Island.

Q. What is your business?

A. Gas-fixtures.

Q. Where do you carry on that business?

A. 591 Broadway.

Q. How long have you been in that business?

A. About thirty years.

Q. During all that time have you or not been familiar with the various kinds of gas-burners and all kinds of gas-fixtures?

A. With most of them.

Q. Do you manufacture or only sell?

A. We sell.

Q. Have you ever seen the burners patented by the complainant, Theodore Clough?

(Objected to on the ground that the witness should be first shown the patent.

Exhibits A, B, and C shown witness.)

A. I have been perfectly familiar with these.

Q. When did you first see the Clough burners?

A. When Mr. Clough first made them. I think it was in 1869 or the early part of 1870.

Q. You had never seen any before?

A. I had not.

64 Q. Will you take one of these burners and explain to the jury wherein there is any difference from the burners which had been in use previously, what its effect is, and its use, if it has any?

A. The old burner passes the gas direct and burns through the open slot; that improvement of Mr. Clough passes two currents of gas, one through the slot which is generally made fine to give the flame direction, and the other through a surrounding-tube to give it volume; by that combination the gas made from gasoline can be burned with a

large, steady flame, whereas by the old burner it could not; when the fluid was at a low gravity it would give a very unsteady and poor light, mostly a blue flame, and when it was of a high gravity and the machine first put in use the quality varied, the gas would be too rich and it would smoke; by this improvement the flow of gas could be regulated giving it volume or reducing the volume.

Q. These effects in burning gasoline or air-gas were not produced by the old bat-wing burner?

A. No, sir.

Q. Have you read the specifications of Mr. Clough's patent?

A. I believe I have, but I did not charge my mind particularly with them.

Q. It is not fresh in your memory now?

A. No, sir.

Q. Look at the two models marked D and E and explain to the jury their operation, whether they are similar or dissimilar from those of Mr. Clough's; whether the construction is different or the same, and whether there is any difference in the operation and in the result produced.

A. The chief features are the same; the two currents of gas, one passing through the inner burner and through the slot, the other through the surrounding-tube giving the volume.

Q. You consider this invention of Mr. Clough's a useful one?

65 A. I do, sir.

Q. You knew it at the time it was brought out, did you?

A. Yes; and I had never seen anything of the kind before.

Q. Do you know anything about the manufacture of burners like these—D and E—by the defendants, the Gilbert & Barker Manufacturing Company?

A. I do not.

Q. Do you ever buy any of these burners?

A. I do not.

Q. Have you ever used any of these gas-machines?

A. I have not.

Q. Have you ever been in their place of business in this city where they sell gas-burners?

A. I have been in their place of business where they sell gas-machines, about the time Mr. Clough invented his burner or after he had invented it.

Q. Who went with you?

A. Mr. Clough.

Q. What did you do there?

A. Solicited their business for these burners.

Q. Did he show them a model of the burner?

A. He showed them his burner and the gentleman to whom it was shown said that he would have it sent to the factory and have it tested, and if it was as Mr. Clough represented they should need them.

Q. Will you now take these five models, three of Mr. Clough's, A, B, and C, and two of Mr. Barker's, D and E, and tell the jury whether or not, in your judgment, there is any practical, substantial difference in their construction, in their mode of operation, and in the result produced in burning gasoline or air-gas?

(Objected to as the witness does not appear to be an expert, and A and B are not made in conformity to complainant's patent.)

Admitted; exception taken.

66 A. Essentially the burners are the same.

Q. Both in construction, mode of operation, and results produced?

A. Yes, as I have explained; I consider this surrounding-tube and double current of gas the essential features of the burners; in that particular they are alike; the other particulars I don't consider essential.

Q. State whether, in your opinion, those burners made by Mr. Clough, marked A, B, and C, are made in conformity with the specifications, directions, and drawings in that patent? (Handing paper to witness.)

A. I think they are.

Cross-examined:

Q. Do you sell gas-burners?

A. We do.

Q. (Handing paper.) Will you be good enough to look at the specifications of Mr. Clough's patent, and state where you find in these specifications the particular construction of the burner, Exhibit C? Read it to the jury.

A. Figure 2, a view showing the surrounding-tube in section, and the burner therein; C, perforations at the base of the burner-tube. These are the features that I recognize in this burner.

Q. That describes that particular form and construction exactly and accurately?

A. Yes, sir; I would say that I consider these the essential features of the burner.

Q. I asked you to find the places in the specifications that describe this particular construction of the burner C, and you read it, did you not?

A. Yes, sir.

Q. Now I ask you to do the same in regard to Exhibit A. Read from the patent, to the jury, that part of the specification that contains the particular, definite, exact construction of that burner.

67 A. I should read the same, sir: Figure 2, a view showing the surrounding-tube in section, and the burner therein; C, perforations at the base of burner-tube.

Q. And that is all that you can find in this patent that described that particular construction of burner, is it not?

A. Well, there are others, but those two are the features that I speak of that in my judgment are essential; there are quite a number of others.

Q. As to the form of construction—limiting it now, please observe in my question, to form of construction, do you not say that the construction of that burner is of a different form from the other—the construction of Exhibit A from Exhibit C?

A. Yes, if I understand it.

Q. Exhibit C has an internal tubular valve?

A. Yes, sir.

Q. Exhibit A has not?

A. No, sir.

Q. Has this particular form of construction, Exhibit A, any description in the patent; I am not asking you whether they are substantially the same, or anything of that kind?

A. It is the same thing as Exhibit D; the surrounding-tube screwed to this burner-tube fully covers it.

Q. Does the specification cover the method of allowing the gas to escape; and this sleeve or slide, is there any description of that?

A. C, perforations at the base of burner-tube; Figure 2, a view showing the surrounding-tube in section, and the burner therein; those three cover every feature in it.

Q. And you say that is an exact specific description of that form of burner, so that any one would naturally make this form of burner instead of making the other with the tubular valve?

A. I should say so.

Q. They are just alike; the same description describes one that describes the other?

68 A. Describes the perforations and the surrounding-tube, and the inside tube.

Q. The inside tubular valve, do you mean?

A. Yes, sir.

Q. What do you mean by the inside tube in Exhibit A—the burner-stem?

A. Yes, sir.

Q. The interior of that tube you call the inside tube?

A. Yes, sir; with the burner therein, here.

Q. That has not any tubular valve, you have stated already?

A. No, sir.

Q. Have you been at any time in your life a practical mechanic?

A. Yes, sir.

Q. For how many years?

A. I have always been one since I was 14 years of age.

Redirect:

Q. You find in Mr. Clough's patent the annular or surrounding-tube in his specifications, do you?

A. Yes, sir.

Q. And his specification for perforating the interior tube at the base?

A. Yes, sir.

Q. For the purpose of allowing an escape of gas, next adjoining the flame, at the tip of the burner?

A. Yes, sir.

Q. You find also a specification for a tubular valve?

A. Yes.

Q. The office of that tubular valve is by screwing up or down to cut off these perforations at the base, is it not?

A. Yes; you may term it a valve.

Q. Is not the same thing performed by screwing this up or down in the same way (showing witness complainant's Exhibits A and B)?

69 A. The same thing, exactly.

Q. And the same thing is produced at the top by burning?

A. Yes, sir.

The complainant's counsel then called SCOTTO C. NASH, who, being duly sworn, testified as follows:

Q. What is your business?

A. I am now a dealer in agricultural implements.

Q. What were you engaged in before that?

A. Manufacturing gas-machines; I was secretary and treasurer of a company who made them.

Q. Did that embrace the manufacture of burners?

A. No, sir; we never made any burners.

Q. While in that business were you acquainted with the burner made and patented by Mr. Clough?

A. Yes, sir.

Q. Did you ever buy any of them?
A. Yes, sir.
Q. When?
A. I think the first we purchased was on the 3d of January, 1870.
Q. Did you buy some afterwards?
A. Yes; we bought them a long at intervals until the present time.
Q. Did you ever buy any burners of the defendants in this action?
A. No, sir; we never did; not during my presence at home.
Q. Did you ever see any burners that were made by them?
A. I have seen those that were said to be made by them.
Q. Where did you see them?
A. They were first brought to my office to show me.
Q. Have you been engaged in buying and selling gas fixtures and burners?
A. Yes.
70 Q. You have been familiar with the construction and operation of gas-burners?
A. Yes, with burners for our gas; I never had much experience with the coal gas-burners.
Q. Did you ever see or know to be used a burner like Mr. Clough's before he invented it and brought it into use?
A. No, sir.
Q. Look at Exhibits A, B, and C and tell the jury wherein they differ from the old bat-wing burner, what was intended to be accomplished, and how they accomplished it.
A. They differ entirely from the bat-wing burner in having this surrounding-tube or outside annular ring which that never had; furthermore, in being perforated at the base.
Q. What was the object of those perforations at the base, and of that annular ring or tube outside?
A. The object of the perforations of the base is to allow an escape of gas through, and the object of the tube is to mingle it with the flame from the gas, which projects from the orifice at the top of the burner.
Q. What is the result produced?
A. It gives volume to the light.
Q. Do you consider it a useful improvement?
A. Very much so, indeed.
Q. Were you ever in the establishment of the defendants for selling these burners in this city?
A. I think not. I have been in the same store on other business, at Covell & Co.'s, but never in their part of it.
Q. I mean where they were selling these burners.
A. No, sir; never.
Q. Look at Exhibits D and E and see if you know what patents they are.
A. That is the burner that was shown to me and called the Springfield burner, as being made by the Springfield Gas Machine Company.
71 Q. Will you explain to the jury what difference, if any there is in the construction, mode of operation, and results produced between those two sets of burners—the Clough burners A, B, and C, and the Barker burners D and E?
A. There is a very slight difference in the method of construction, but in the result there is no difference whatever.
Q. Is there any difference in the practical operation of the machine?
A. None whatever, that I can detect at all.

Cross-examined:

Q. I understand you to say that you have no special familiarity with coal-gas burners.

A. I have never used them—only sold them. I have tried all that I could ever obtain to get one that would burn air-gas. I have sought for them in different countries as well as here.

Q. In what connection were you interested in the air-gas business?

A. I was secretary and treasurer of a company who manufactured the machines, and was also a stockholder in the company.

Q. What company?

A. The American Portable Gas-works Company.

Q. Where does that company do business?

A. Organized under the laws of the State of New York; factory has been in Jersey City.

Q. Are they in business now?

A. They are.

Q. Have you read the specifications in Mr. Clough's patents?

A. Not recently. I think I did years ago.

72 THEODORE CLOUGH recalled.

Direct examination:

Q. (Handing him papers.) Will you state when and how you procured those two pamplets—how they came into your possession?

A. This pamphlet of Barker about an adjustable burner was sent me by mail to my shop.

Q. When?

A. I have not the date.

Q. About?

A. I should say it was last month, as near as I can recollect.

Q. The other one—when did you get that?

A. That was obtained some two years and a half ago.

Q. I omitted to ask you when you were first on the stand whether, in making this application for your patent you paid the $30 required by law?

A. I did.

(Pamphlets put in evidence, and marked Complainant's Exhibits 3 and 4.)

ALONZO T. WALSH, called by plaintiffs, being duly sworn, testified as follows:

Q. What is your business?

A. Manufacturer of gas-machines.

Q. Where do you carry on that business?

A. 176 Centre street.

Q. How long have you been engaged in that business?

A. For the past four years as secretary and treasurer of a Maxim gas-machine company, New York.

Q. Do your manufactures embrace burners as well as machines?

73 A. No, sir.

Q. You are familiar with the use of burners?

A. Yes, sir; with our gas more especially.

Q. More so than with coal-gas?

A. Yes.

Q. Do you know the Clough burner, invented and patented by Theodore Clough?

A. I do.

Q. Have you read the specifications in Mr. Clough's patents?

A. A long time since; not recently.

Q. Look at the Exhibits A, B, and C, and tell the jury wherein they differ from the gas-burners in existence before they were invented.

A. The essential features of these burners are that they have a surrounding tube with an opening at the base. The improvement, in my mind, consists in their having a finer slot by which the flame is given shape, with holes at the base of it fitting that slot, and burning the gas at two different pressures.

Q. Will you describe to the jury how the results you have indicated here are produced?

A. Before this burner was invented it was customary to make what was known as the bat-wing burner, with a large slot, as air-gas required a larger slot to get a larger volume of gas through the burner, and the rapidity of the gas going through this large slot created a wavering or unsteady flame, which was a serious objection to our gas business; in this made by Mr. Clough there is a very fine slot which, with the surrounding-tube and the perforations at the base, produces a steady flame similar to that produced from burning coal-gas, and various qualities of gas can be burned; when the gas is excessively rich, as it is sometimes in carburetting machines, by shutting up the perforations of the base the gas can be burned without smoke, and when it becomes reduced by opening the holes you get a larger volume of gas through and get a very fair light, where, with the old burner, the light would be very poor.

74 Q. Did you ever buy any of the gas-burners made by the complainant in this city?

A. I have bought a great many of them.

Q. Where did you buy them?

A. I bought them of Mr. Clough at his place of business.

Q. Have you bought them of the defendants in this suit?

A. No.

Q. You have bought Mr. Clough's burners frequently?

A. Yes, sir.

Q. Look at these Exhibits D and E, and state to the jury wherein they differ, if at all, in their construction, in their mode of operation, and in the results produced from the Clough burners that you have just explained.

A. I cannot see that there is any practical difference in their construction or mode of operation, as in my experience the only thing that is of importance in this burner is the surrounding-tubes and perforations at the base; the simple differences in devices in manufacturing them I consider of no importance; the principle involved in this burner is the surrounding-tubes with the perforations at the base, closed at the bottom and open at the top, burning gas under two different pressures, and through the slot under a high pressure, and through the annular under a low pressure.

Q. Look at the specifications and drawings in Mr. Clough's patent, and state whether, in your judgment, Exhibits A, B, and C are made in accordance with the specifications and drawings in that patent.

(Objected to by defendants' counsel, as the witness is not shown to be a competent expert; objection overruled; exception taken by defendants' counsel.)

A. I should say they were.

75 Crossexamined:

Q. You have been a customer of Mr. Clough's?

A. Yes, sir.

Redirect:

Q. Did you ever have any conversation with Mr. Barker, the defendant in this suit, about the number of burners of this sort that he sells?

(Objected to; objection sustained.)

WILLIAM MCGREGOR, called by plaintiffs, being sworn, testifies as follows:

Q. What business are you engaged in?

A. Gas engineer.

Q. Do you manufacture gas-burners?

A. No, sir.

Q. Gas-machines?

A. I have been manufacturing gas-machines.

Q. For burning gasoline or air-gas?

A. Gasoline and air-gas.

Q. How long?

A. Since 1863.

Q. Are you familiar with the use of burners used for burning gasoline or air-gas?

A. Yes, sir; every burner that has been in the market; I have seen every one.

Q. Did you buy any of the Clough burners?

A. No, sir; I never did, but the gas-machine company for whom I was superintendent did.

Q. Did your company ever buy any Barker's burners or Springfield Gas Machine burners?

A. No; not to my knowledge.

Q. Do you know anything about their sales?

(Objected to; objection sustained.)

76 Q. Will you examine these Exhibits A, B, and C, and tell the jury wherein they differ from the gas-burners formerly in use before Mr. Clough made them?

(Objected to as to A and B; objection overruled; defendants except.)

A. They differ in having a combined annular chamber and slot.

Q. What difference do you find between these and the Barker burners marked D and E?

A. I should say the same features are embodied in those as in Mr. Clough's, having a fine slot and an annular.

Q. With perforations at the base?

A. Perforations at the base of the interior tube.

OAKES TIRRELL, called by plaintiffs, being sworn, testifies as follows:

Q. What is your business?

A. I am a builder of gas-machines.

Q. Do you manufacture gas-burners also?

A. I do not manufacture them.

Q. You are familiar with the use of the different sorts of burners?

A. I have used almost every sort, I believe, that has ever been made.

Q. How long have you been at the business?

A. Since 1862.

Q. Do you know Clough's burner?

A. I am well acquainted with it.

Q. What was the difficulty in using the old bat-wing burner, as applied to gasoline or air-gas?

A. The trouble with the bat-wing burner is, that it is only suitable for one grade of gas, and that grade of gas ran a short light in the building of gas-machines; it is entirely impracticable when a bat-wing burner is put on a gas-machine; the gas is so rich, when the ma-
77 chine is started that the flame is a very smoky one; when the gas gets below a certain point in quality the bat-wing burner will be entirely impracticable; with a bat-wing burner you get a poor light, and with a rich gas you get a smoky light, which destroys the practicability of the ordinary bat-wing burner.

Q. Examine these burners, A, B, and C, and tell the jury whether you find them to be intended to remedy those defects that you speak of.

A. Every one of these burners would, in a very great measure, remedy the defects that I have mentioned, as being connected with the ordinary bat-wing burner.

Q. By what means would they remedy them?

A. The mechanical construction of this burner is all alike; it consists of a shell with a burner supplied with gas from two different quarters, but it is impossible for a juror or any person to understand the philosophy of that burner—of either of these burners—without an explanation of the ordinary bat-wing burner; no burner that has a shell around it, with a separate orifice, can be understood without an explanation of the ordinary bat-wing burner.

Q. Look at these drawings and see if you find anything corresponding to the bat-wing flame, and to the improved flame produced by these burners.

A. In order to understand these burners it is necessary to understand the light produced by an ordinary bat-wing burner; an ordinary bat-wing burner is nothing more than a roll of iron with a slot cut with a pipe through which there is an orifice; if you open that valve and turn the cock, you throw a jet of gas into the air; you take your match and light the surface of that flame, and inside of the flame there is always and all the time a core of unburnt gas, just as pure a gas as is in the pipe, and the light that you obtain from the bat-wing burner is the pressing out of the gas from the centre, pushing to the surface all the
78 time, and a very thin core of that gas is only lighted; now, it takes a certain time for the carbon to force itself through; the infinitesimal particles of the carbon become red hot, but it takes a long time for the particles of carbon to get hot, and you have a sheet of flame with an unburnt volume of gas inside; in each of these burners the gas is taken as it were from an entirely different source, and thrown on the surface of the burner; that is the peculiarity of the burner, and it makes no kind of difference where that gas comes from, whether it comes from a shell or from the orifice, it is gas thrown on the surface of the burner from the outside; that is precisely the operation of this; I may illustrate that in this way: You take a heap of shavings and light them without handling them, and you get an unburnt core of shavings. Now, if you want to increase the flame of your shavings you scatter them, and in that way you get the fire through the whole of your pile of shavings; that is exactly the operation of that burner; it is the operation of taking gas from different sources and throwing a small quantity into the fire and heating it at once; that is the operation of that burner.

Q. Examine the Barker burners marked Exhibits D and E, and state to the jury and the court whether, in your opinion, they are not sub-

stantially the same in construction, mode of operation, and effects produced.

A. There is not a particle of difference; the gas comes from different sources, and is thrown upon the surface of the flame; these burners are the same thing; this burner is extirely different from the burner which I suggested myself, and which I considered a failure; I suggested it to Dr. Coolidge; Dr. Coolidge was man who knew nothing about gas, but happening to hear me make a suggestion that what was wanted in a burner was an adjustable slot, the very month afterwards he brought me that burner, but it proved to be a failure.

(Objected to.)

79 Q. What was the difficulty that made it fail?

A. The difficulty was that it was a sheet of flame; and it simply enlarged the flame; it didn't throw any gas, as this one does, from the outside; that was all; this burner is an entirely different thing on a different plan; that simply enlarged the sheet of flame making it thicker than it was before, and, of course, it would give more light.

Q. (Handing samples.) Do you find that to be a Coolidge burner?

A. Yes, sir; it is an ordinary bat-wing burner, and by means of this shell you get more gas and enlarge the flame; I thought it was a good idea when I suggested it, but I find it did not answer.

Q. (By a juror.) Is this true of coal-gas?

A. Yes, sir; this idea of thowing a small quantity of carbon is just as good with coal-gas, or any light under heaven; the idea is that in an instant the hydrogen is burnt, so that you get your light entirely from the incandescent infinitesimal particles of carbon; with this machine you get more light with a less quantity of gas; the same operation with a common candle would result in the same thing.

Cross-examined:

Q. Why has not this wonderful discovery you have been explaining to the jury been applied to coal-gas?

A. That I cannot tell you; I can only say that the wonderful discovery—I don't think it is a wonderful discovery; at this present moment I don't think that one man in ten thousand knows anything about the burning of gas, therefore it is not strange to me that it has not been applied, for I don't think the knowlege exists.

Q. You think there is ample room for improvement in gas-burners?

A. Yes; I think there are very few men that are experts on gas.

80 Q. Have you noticed particularly the burner, Exhibit C, that was handed you?

A. I see it now, sir; it is a little different application of the same principle.

Q. You have examined it?

A. Yes.

Q. That is a different form of construction from Exhibits A and B, is it not?

A. Yes; very considerably.

Q. How long have you known these Coolidge burners?

A. I cannot tell you how long it was since; but certainly I should say as early as '64 or '65.

Q. Please look at the Coolidge burner and state if that has not a tube surrounding the burner-stem?

A. Yes, sir.

Q. Please look at it and state whether there is not a perforation in the burner-stem, allowing the gas to escape from the interior of the tube to the outside of the burner-stem, and if the gas cannot also escape out of the top of the tube and communicate with the flame?

A. Yes, sir; I should say it could.

Q. And this has been used since 1864 or 1865?

A. Yes, sir.

Q. Do you consider it important as to the point in the burner-stem in which the perforation is, whether it is a little lower or a little higher, in the operation of the burning?

A. No, sir; I don't consider that of particular importance, whether it goes down exactly to the bottom or comes up on the side.

Redirect:

Q. Take that model of the Coolidge burner, and state the difference in the construction and operation of that burner from Mr. Clough's and why that would not succeed.

81 A. This burner as it stands now is a mere bat-wing burner, no difference from any other burner, one sheet of flame coming out there; now if you want to get a larger flame, you turn this round; but this is not a proper Coolidge burner; in a proper Coolidge burner you would have a sluggish flame; in this burner you open your slot wide, and you have this broad sheet of flame burning from the outside, whereas in the Springfield burner you have narrow flame coming to the outside, and the gas coming from the outside.

(Witness describes the burners referred to, to the jury.)

Recross:

Q. I understood you to say, upon my cross-examination previously, that there is an aperture in this Coolidge burner to the exterior?

A. So there is.

Q. I understood you to tell the jury that gas could escape from the top of the surrounding tube to the flame in that Coolidge burner?

A. So it will, it will leak out.

Q. It passes out as well as leaks out?

A. It leaks out.

Q. The gas does pass out?

A. It passes out, but not for that purpose.

Q. It passes out?

A. It leaks out.

(Question repeated.)

A. Yes.

HIRAM S. MAXIM, called by plaintiffs, being duly sworn, testifies as follows:

Q. What is your business?

A. I am a gas engineer.

Q. Engaged in manufacturing gas-machines?

82 A. Yes, sir.

Q. Burners also?

A. I have made a few burners, but not many.

Q. You are familiar with the use and operation of burners?

A. I am, and I have had all there is in the country laid before me for my judgment to pass upon them.

Q. You have seen the various patterns?

A. Yes.

Q. How long have you been in that business?

A. About ten years.

Q. Have you been extensively engaged as an expert?

A. Yes.

Q. You have been frequently called upon to testify as an expert in patent causes?

A. Yes, sir; I have been several times called upon to testify on gas and lamps.

Q. You are a practical mechanic?

A. I am.

Q. You understand the mechanical construction of these machines as well as their mode of operation, do you not?

A. I do.

Q. Do you know the burner invented and made by the complainant, Theodore Clough?

A. I do. I am familiar with it.

Q. State to the jury whether you consider these Exhibits A, B, and C are made in accordance with the specifications and drawings in that patent.

A. They are all modifications of Clough's patent.

Q. What was the difficulty with the old bat-wing burner, that was intended to be remedied by Mr. Clough's patent?

A. The difficulty in burning carburetted air by the bat-wing burner consisted in the fact that if you give the burner sufficient force you would get a wide flame—a blue flame that could be easily extinguished, and if you wanted more force it would give a torch flame. The
83 first practical burner that I ever saw was one exhibited at our place in the spring or early summer of 1870. That was worked by giving velocity to the flame—giving it force and direction. This opened a new era in gas-machines. I don't know who these burners are made by, but the defects which it remedied are the fatal features in gas-burners. I know not who got this patent up, but I see these are the same. I have looked at specifications and drawings in the patent, and I don't know of anything being different in them; these are the same, only a different modification.

Q. Examine them and see if they are made substantially in accordance with the specifications and drawings in that patent.

A. Yes, sir; the one I see is identical with the specifications, as far as I can see from the outside, though I cannot get it apart to see from the inside; letter C is the same as the drawing in the specifications.

Q. Are you familiar with the burner made and sold by the Gilbert & Barker Manufacturing Company?

A. Yes, sir. I have examined the copies of their patent also.

Q. Have you ever bought any of them?

A. I never did.

Q. Examine these Barker burners marked D and E.

A. These burners are the same as sold by the Gilbert & Barker Manufacturing Company, and they are identical with the drawings on their patent, as far as I can remember, from the time that I examined them.

Q. Will you tell the jury whether or not there is any material difference in construction, mode of operation, and the results produced, between the Barker burner and the Clough burner which you have just explained to the jury?

A. There is a difference in the mechanical construction, but in principle they are identical.

Q. In your judgment the Barker burner is the same as the Clough burner?

A. Practically the same; there is a little difference in construction, but the operation is identical.

Q. The theory is the same?

84 A. The theory of burning gas is the same.

Q. The mode of producing the result is exactly the same?

A. Yes, sir.

Q. You are something of a draughtsman as well as machinist, are you not?

A. I am.

Q. (Handing paper.) Did you make those drawings?

A. These drawings are a production of mine.

Q. Will you go before the jury with them and tell them which is the old bat wing burner, which is the Clough burner, and which is the Barker burner, and what are the differences between them?

(Witness exhibits the drawings referred to to the jury, and describes the burners mentioned in the question, and the form of the flames produced by the respective burners.)

The drawings correctly represent the flames. They are the same in Exhibits A, B, C, D, and E. The Horace Barker burner and the Coolridge burner produce flames of different shape from those produced by complainant's and defendants' burners, as you will see by the drawings.

Drawings put in evidence and marked Complainant's Exhibit III.)

Cross-examined:

Q. The burner Exhibit C, which was handed to you, which you say was identical with Mr. Clough's original burner, is more expensive to make, is it not, than the burner which was made by the Gilbert & Barker Manufacturing Company?

A. Yes, sir; it had more pieces in it.

Q. In other respects I understood you to say that you consider it an advantage that in Mr. Barker's burner the flame was not made to revolve when it was regulated?

85 A. Yes; that is one advantage, because in some places it is necessary to have the flame made stationary.

Q. In regard to the new burner of Mr. Clough's, of which you have given an illustration, is not that burner so constructed that it can be made cheaper than Mr. Clough's original burner?

(Objected to by complainant's counsel. Objection sustained, and exception taken by defendants' counsel.)

Q. In your machines what is the peculiarity, if any, in regard to the gas?

A. The gas we make is of the same density, so that it is not necessary to have the burner adjustable; the gas coming from the inside and from the outside of an ordinary density that gives shape, and they don't need to be adjusted at all.

Q. In other words your gas is not rich and poor?

A. No, it is always exactly the same; the burners made for our use are only made in two pieces.

Redirect:

Q. Look at Clough's Exhibits A and B, and see if they are not constructed in accordance with the specifications in Clough's patent, and so as to produce the results claimed in Clough's patent?

A. B is one of Mr. Clough's burners made rather shorter than usual; the form is the same, but not all the features of his patent; it is the same in principle, but not in detail; not so much of it.

Q. The operation is the same in allowing the gas to escape between the two by the annular ring or circle?

A. Yes, sir; they have the annulus and slot.

Q. They have the perforations at the bottom?

A. They have the perforations at the bottom of the inner tube.

86 Q. And it allows the gas to pass off to the flame at the tip?

A. After the gas escapes through the inner one.

Q. The quantity of gas thus escaping is increased or diminished by screwing up or down?

A. Yes.

Q. And the gas is adjusted—increased or diminished in the burners A and B—by turning the valve around?

A. Yes, sir.

Q. Is not the same method used in the two burners of Barker's Exhibits D and E?

A. Yes.

Complainant rests.

Adjourned to Thursday, May 21st, at 11 a. m.

U. S. circuit court.

THEODORE CLOUGH
vs.
THE BARKER & GILBERT MANUFACTURING Co. } Trial continued, May 21, 1874.

Defendants call as a witness HORACE R. BARKER, who, being duly sworn, testified:

Q. Where do you reside, Mr. Barker?

A. Lowell, Massachusetts.

Q. What is your business?

A. Manufacture and sale of brass and iron goods for steam, gas, and water.

87 Q. Putting in steam, gas, and water, did you say, or manufacturing only?

A. Manufacture and sale; I am contractor for lighting buildings by gas and heating by steam.

Q. Heating by steam and water and lighting by gas?

A. Yes, sir.

Q. How long have you been engaged in your present business?

A. About twenty-five years?

Q. At Lowell?

A. Yes, sir; about 20 years at Lowell—20 years this summer.

Q. How extensively are you engaged in that business there?

A. Quite extensively; employ from 35 to 40 men all the time.

Q. Are you familiar with air-gas machines and gas-burners of various descriptions?

A. I am.

Q. How long have you been familiar with them?

A. About eight years.

Q. Will you look at these burners which are shown you and state, if you know, where these burners came from?

A. They came from our shop at Lowell—were manufactured there.
Q. Manufactured in your shop at Lowell?
A. Yes, sir.
Q. When?
A. In November, '68, we made the first burner.
Q. Can you select from those the first one—the one that has your initials?
A. (Selecting burner.) I should say that is the one.
Q. That has your initials on it—H. R. B.?
A. Yes, sir.
Q. What did you do with them after they were made?
88 A. Put them on our gas-pipe, and used them in connection with our petroleum-gas machines.
Q. You light your works with an air-gas machine?
A. Yes.
Q. That is a machine by which gas is made from petroleum, known as air-gas?
A. Yes, sir.
Q. You put them on—how soon after they were made?
A. Immediately.
Q. How long have they been in use since?
A. Been in constant use ever since.
Q. How long since they were taken off?
A. Those three I took off last Monday afternoon.
Q. That is the original one; that has been off how long? You sent that to me about a year ago.
A. I could not say.
Q. These are the three taken off last Monday afternoon?
A. Yes, sir.
Q. Now, will you be good enough to take the original one, and explain to the court and jury the operation of that burner practically, as it has operated in your shop?
A. The spring in that way comes up from the valve-seat; this perforation admits the gas into the surrounding-tube; by screwing it down we close the orifice so as to lessen the size of the slot, and keep it burning in the usual way when the gas is too rich; by screwing it back in that way the gas is admitted in an extra supply, also opening the slot here near the valve-seat (which is the seat of the valve—conical valve inside), and, of course, admitting an extra supply of gas to the tip.
Q. Do I understand you that, by means of this burner, there are two supplies, one in the interior of the burner and one exterior, that passes out when the burner-tube is screwed up?
A. Yes, sir.
89 Q. And is not this burner so made that the supply of gas escapes from the top when the surrounding-tube is screwed up and forms a circular flame around the burner?
A. Yes, sir.
Q. (By a juror.) You say this was used in '68?
A. Fall of '68; yes, sir.
Q. Who invented this gas-burner of yours?
A. I did.
Q. You did yourself?
A. I did, sir.
Q. How came you to invent it?
A. After we put our machine in, and I was somewhat familiar with the operation of air-gas, I saw the necessity of having a burner adapted

to it, therefore I put my wits to work to make one that would answer the purpose.

Q. Had you at that time seen the patent of Coolidge?

A. No, sir.

Q. Did you make application to the Patent Office for a patent for your burner?

A. Yes, sir.

Q. Is that a certified copy of the application you made?

A. Yes, sir.

Q. Did you receive a reply to your application?

A. I did.

Q. Is that the paper you received?

A. Yes, sir.

(Defendants' counsel read in evidence certified copy of application filed Feb. 25, 1869, a copy of which is hereto annexed, marked Def'ts' Exhibit No. 1, May 21, '74, and offered the four burners testified to by Mr. Barker in evidence. They are Exhibits F, G, H, I.)

Cross-examination:

Q. You say you had not seen the Coolidge burner when you invented yours?

90 A. No, sir.

Q. You are a brother of the defendant John F. Barker, in this case?

A. Yes, sir.

Q. Did you work together at that time or separate?

A. Separate.

Q. He had your burners at the time, hadn't he?

A. I sent him one after I got it done.

Q. All the burners you exhibited were made about the same time?

A. Made in the winter of '68 and '69, a good many of them; I couldn't say how many.

Q. Your brother saw them soon afterwards?

A. Yes, sir.

Q. There is one point in the operation of those burners I did not understand, where is it that the outside supply of gas is admitted?

A. By screwing the surrounding-tube up and raising it off the valve-seat; that admits the gas through here, giving an extra supply, and also opens this slot here—the slot being closed by the disc here.

Q. Is the interior of this circular ring larger at the base than at the top?

A. It is.

Q. Then screwing it down presses this together?

A. It does.

Q. Then, when it is screwed down tight there is no escape from the interior stem of the burner through the aperture to its surrounding-tube?

A. Yes, sir.

Q. And the higher you screw it the wider the top of the slot opens?

A. Yes.

Q. Then the greater the escape of gas between the top and the circular ring?

A. Yes, sir.

Q. Have you been using any of your brother's burners since you put up yours?

A. Yes, sir.

91 Q. How many of them?
A. Quite a number; I could not say how many.

Redirect examination:

Q. How does this work in comparison with those made by your brother and Mr. Clough?

A. Well, that works so well that we didn't care to remove it to put on theirs, so we continued to use it on those fixtures for five years; we didn't choose to remove it, although we had plenty of their burners.

Q. Do you wish the jury to understand that that worked just as well as theirs?

(Objected to.)

A. That worked satisfactory to us.

Q. I understood you to say you had plenty of the others there you could put on at any time?

A. Yes, sir.

Defendants call as a witness ELLIOT P. GLEASON, who, being duly sworn, testified:

Q. Where do you reside, Mr. Gleason?
A. Brooklyn, sir.
Q. What is your business?
A. Manufacturer.
Q. Of what?
A. Gas-burners.
Q. Where is your place of manufacture?
A. Corner of Mercer and Houston streets, New York.
Q. You manufacture what?
A. Gas-burners, principally.
Q. How extensively?
A. Well, sir; I employ from seventy to a hundred hands.

92 Q. How long have you been in the business of manufacturing gas-burners?

A. Some twenty years.

Q. How does the extent of your business in the manufacture of those articles compare with other manufacturers in New York?

A. I think we are very much larger than any other manufacturer.

Q. In the city and in the country?

A. Or in the country.

Q. Are you familiar with the various kinds of burners which have been used and sold as well for burning air-gas as coal-gas?

A. I am.

Q. Are you well acquainted with the description of burner in the complainant's patent—Clough's patent—have you read the specification?

A. Yes, sir.

Q. You know the burner that is made by Mr. Barker—John F. Barker?

A. Yes, sir.

Q. Have you seen those burners which have been put in evidence this morning which Horace R. Barker brought?

A. I have seen them; yes, sir.

Q. And you understand them?

A. I think I do, sir.

Q. Have you been engaged to any extent in patent cases yourself?

A. I have, sir.
Q. Had some experience and observation in the matter?
A. Yes, sir.
Q. What do you say, Mr. Gleason, as to the operation of those burners of Mr. Horace R. Barker, which have been introduced, and the burner of Mr. Clough, the complainant, as to their agreeing with each other?

Cross-examination by Mr. YEAMANS (as to competency):

93 Q. You are not a practical mechanic, machinist, yourself?
A. I am.
Q. Do you work yourself?
A. I do; and have for twenty years.
Q. Do you work at the business yourself or give directions to your workmen?
A. Yes, I give directions.
Q. You don't work yourself?
A. Yes, I do work myself; every day.
Q. Did you ever make one of these gas-burners yourself personally?
A. I have not made these, but I have made others of various kinds.
Q. You spoke of being involved in patent cases; were you involved as a party or as an expert?
A. Party.
Q. Party defendant?
A. No; one of the plaintiffs.
Q. You were the owner of a patent?
A. Yes, sir.

Direct examination resumed:

Q. Now be good enough to state, Mr. Gleason, your opinion as to the operation, the practical operation of these two burners—the Horace R. Barker burner and the defendants' burner?
A. I should say they were substantially the same thing in operation and use.
Q. They convey two separate flames; one interior to the burner pillar, and one exterior within the surrounding tube, to the flame, do they not?
A. Yes, sir.
A. They are both adjustable; you convey those two currents if you choose or only one of them?
A. Yes, sir.
94 Q. And, as far as you judge, operate the same way?
A. Substantially the same.
Q. Mr. Gleason, was the bat-wing burner anything new in 1870, a mere bat-wing burner?
A. No, sir; quite old.
Q. Was the bat-wing burner perforated at the base a new thing in 1870?
(Objected to as too general.)

Cross-examination:

Q. What kind of a flame does that burner make when the two streams of gas join at the top; this kind of a torch flame or a bat-wing flame?
A. In what condition, when closed or open?
Q. When open so as to admit gas from both supplies.
A. I should say bat-wing in form.
Q. You have never seen it burn, have you?

A. I don't think I have.

Q. And you never saw this one of Mr. Barker's burn?

A. Not this particular kind.

Q. I allude to this of Horace Barker.

A. Horace R. Barker; yes, sir.

Q. Now, when you state that their practical operation was the same, look at that (showing witness one of complainant's burners) and tell the jury if, by screwing this annular ring up and down, the slot at the top of that burner does not remain exactly the same—neither opens nor shuts; the question is whether there is any variation in the slot by screwing that annular ring up or down?

A. No variation in the slot; no, sir.

Q. It remains the same; lets out the same amount of gas?

A. Yes, sir.

95 Q. Now examine this burner (showing witness one of Horace R. Barker's burners) and see if the slot at the top does not contract and expand as it is screwed up or down.

A. It does.

Q. Now examine it further and see if, when it is screwed down sufficiently to close it at the top, it is not also closed all the way down.

A. It is not closed all the way down.

Q. It would not be closed.

A. I should suppose not.

Q. When it is screwed down so as to close the top of the slot on this burner, is not also the escape of all gas prevented between the burner and the surrounding-tube?

A. I should think not.

Q. Then when this tube is so closed as to cut off the flame from the tube here, there would be nothing burning but this escape?

A. I think it would be impossible to close it so there would not be a flame come out of the tube.

Q. Impossible?

A. Yes, sir; by any mechanism there.

Q. As you screw this down does it not have a tendency to decrease the supply of gas that comes through the slot here, and also the supply of gas that comes out of the upper bat-wing, the burner?

A. Screwing down decreases both.

Q. And screwing up increases them?

A. Yes, sir.

Q. Whereas in the other burner the slot remains stationary when you revolve this tube; it leaves that from the top of the slot always the same?

A. It leaves that always the same.

Q. This only regulates the supply of gas escaping at the bottom of the tube?

A. Not at all.

Q. Do you understand this burner?

A. I do, sir.

Q. Tell the jury how it does operate?

96 A. This outer tube does not regulate the supply of gas which goes into the outer chamber; revolving this does not affect the flow, neither by opening or closing the slot at the top, nor the flow of gas through the top which induces the combustion; it does not change it at all; that is fixed.

Q. Then tell the jury what it is which regulates the supply of the external gas that joins the flame at the top.

A. That Ex. C has three pieces which are entirely separate; one that is called in the patent the "tubular valve," and the graduation of the flow of the gas is produced by revolving the entire burner, and when that is done the operation is substantially and identically the same as that of Horace Barker when the whole thing is combined; this piece is another thing, separated entirely both in form and action.

Q. Examine this one, if you please, Mr. Gleason—this is one of Mr. Clough's—and tell the jury if the supply of gas from the tube in that one is not constantly the same (Ex. A handed witness).

A. The revolving of the outside tube does not affect the flame—the size of the flame when it comes direct through the burner.

Q. Nor the quantity of gas that goes direct through the burner?

A. Nor the quantity of gas.

Q. That remains the same; the mere revolving does not affect it?

A. No, except when screwed down to a certain point; then it opens the apertures below and admits a current of gas through the outer chamber.

Q. Then how is the current of gas that comes up from the outer chamber increased or diminished?

A. By screwing this out or in—screwing it far enough—the mere revolving this when once set does not affect the flame at all.

Q. You have said you never tried these burners of Horace Barker; did you ever try the Coolidge burner?

97 A. Yes, sir.

Q. The intent of that burner was to have the surrounding-tube adjusted so as to be gas and air tight, was it not—to be ground close?

A. I don't know what the intention was.

Q. Were you ever an agent for Mr. Barker in selling his burners in New York?

A. No, sir; I don't think I was.

Q. Ever sell for him?

A. No, sir.

Q. Did you ever buy any of him to sell here?

A. Yes, sir.

Q. A good many?

A. Yes, sir.

Q. Burners like these? (Showing witness defendants' burners, Complainant's Exhibits D and E.)

A. Yes, sir; similar to those.

Q. You were defendant in this action originally, as first brought?

A. I think I was.

Redirect examination:

Q. You have not bought any like the complainant's Ex. D (handing burner to witness); have you looked at that, the appertures high up?

A. I don't think we have bought any like that particular burner.

Recross-examination:

Q. What is the difference between that and the one I showed you, except in shape, size, or something of that sort?

A. The only seeming difference is the location of the perforations.

Defendant calls as a witness JOHN F. BARKER, who, being duly sworn, testified:

Q. Mr. Barker, you are one of the defendants?

98 A. I am.

Q. You are the patentee of the burner which the defendants have made; you are the Mr. John F. Barker?

A. I am; yes, sir.

Q. Please state whether you have ever made for sale any of the description of burners Exhibit D.

A. I never did; I presume I may have made a dozen of them by way of experiment.

Q. By way of experiment?

A. By way of experiment originally.

Q. Never made them for sale, or put them to use?

A. I never did.

Q. You preferred these second burners—Ex. E?

A. Yes, sir.

Q. Those you have made?

A. Yes, sir.

Cross-examined:

Q. These are such as you have been making ever since you got your patent, are they not; I allude to Exhibit E?

A. Except that the pattern may have been slightly altered.

Q. I mean in general construction.

A. Yes, sir.

Defendants call as a witness HENRY B. RENWICK, who, being duly sworn, testified:

Q. Please state your occupation and residence to the jury.

A. I reside at 29 Park avenue, in the city of New York; I am, by profession, a civil and mechanical engineer; my principal occupation at the present time is the examination of machine patents; I do
99 some business with the Patent Office, and I am frequently called as an expert in patent cases in this and other courts.

Q. To what extent have you been employed as an expert in patent cases?

A. I may say from fifteen to twenty cases a year for the last twenty years.

Q. In this and other States?

A. Yes, sir.

Cross-examined by complainant's counsel as to competency:

Q. What is it that constitutes a patent expert?

A. Well, it is hard to say; he requires a general knowledge of machines and machinery, and he ought to have had some experience of the particular machine in question.

Q. Is it sufficient that he just goes to work and looks up that particular subject?

A. He ought to do a good deal more than that; I worked for twelve years as engineer.

Q. Engineer of what?

A. For a great many years I was employed by the government.

Q. You never made a gas-burner?

A. I never made them, but I have experimented with them.

Q. You are not a practical worker in brass and iron?

The COURT. Mr. Renwick is an expert, and has been held so frequently.

Direct examination resumed:

Q. What was your business when employed by the government?

A. I was employed chiefly in the construction of forts and light-houses in the harbor of New York.

Q. (By Mr. YEAMANS.) Those guns didn't shoot with gas?

100 A. No, sir; but I have shot with gas—had guns that would.

Q. (By Mr. STANLEY.) Look at Complainant's Exhibit C, and state whether you understand its construction and operation.

A. I do, sir; I have burned a burner like this this morning.

Q. Will you look at these Horace R. Barker burners, which have just been put in evidence, and see whether you understand their operation and construction?

A. I examined these burners last evening, and this morning had these burners screwed on to gas-pipes with kerosene gas, and tested their operation.

Q. You mean petroleum gas?

A. Yes, sir; petroleum.

Q. And this burner like Ex's D and E?

A. I have examined that burner and tested it.

Q. Please go on in your own way, Mr. Renwick, and state whether these burners are alike or different, and in what respects, and your reasons.

A. This burner, which I am informed is the plaintiff's burner, is, in the first place, an ordinary "bat-wing" burner, being a burner which has a slit through the top; then, different from the ordinary burner, it has a series of small holes, which you see are bored out from the inside to the outside of the burner tube; outside of the ordinary burner thus altered there is screwed this tube. Now, the effect of screwing on that tube, supposing the burner to be burned in that condition, is that you have two jets of gas, one the ordinary bat-wing jet, and the other the tubular jet of gas, coming up between the burner and the tube; the gas passes up through the centre and out at the top, and part of it passes through the holes into that little space and comes up through the tube. When there is a considerable pressure these two jets will produce what is called a "torch" or irregular flame, and we can burn much more gas than if we had only the ordinary bat-wing.

101 Now, in addition to these parts, there is in this burner C this small tubular valve; the office of that valve is twofold; first, all the gas which goes through the burner, either outside or in, or through the bat-wing, must pass through that tubular valve; when you turn the burner down on the valve, after a certain distance it commences to shut these little holes; if you screw the burner all the way down these holes are entirely shut, and the burner acts as a common bat-wing burner; the further you screw the burner up the more you throw the valve out, and uncover these little holes, and, consequently, the more you increase the flow of gas through the tube. The object of the burner I understand is this: this gas, made by blowing air over gasoline, is very variable in quality; sometimes what is called rich, and sometimes poor, so that you must burn a good deal more to get the same light. The advantage of this burner of the plaintiffs is that by screwing this up you can burn more of the gas and get the same amount of light as you could with rich gas, flowing only through the ordinary bat-wing burner.

Q. (By JUROR.) What was the letter of this last one?

A. C. Now, the defendants' burner—Barker's burner—is, like the plaintiff's burner, a bat-wing burner, which has got holes through the tube in the same way as the plaintiff's; they were not exactly in the same spot, but the spot don't make any difference so long as you can

shut the valve; this burner, like the plaintiff's, has them at several heights; this is a bat-wing burner with holes in the stem; their shape makes no difference; around that there is a tube; when this tube is entirely screwed down, you, gentlemen, will notice there is a large space in the tube outside this wheel; when the outer tube is entirely screwed down upon the burner, these holes bored through the burner come opposite that large place in the tube, and the gas will pass out through those holes, come up through this tube, and pass out in a ring around the bat's-wing burner, and that burner
102 will burn exactly like the plaintiff's burner without the valve in it, and you have the combined flame; the flames are both alike; in order to reduce the quantity of gas which will pass through the holes in the plaintiff's burner, he has got this tubular valve; now, the defendants' burner gets rid of that valve entirely; this has only got two pieces—the outside tube and the gas-burner; although there is no tubular valve through which the gas passes and which regulates the opening of the holes, there is what amounts to a valve; because, when I screw that piece which I hold in my left hand—the tube—up into that position, why, then, the screw turns off this female screw up from these holes in the female screw and acts as a valve, so, as I before explained, this burner, in that condition, will act the same as the plaintiff's in like condition; you notice one thing, that in these (defendants') burners the jet of gas is always pointed in the same way—that is, the bat's-wing stands still. I may screw this down so as to close the openings, or I may screw it up; the bat's-wing never turns around; also notice in this burner the valve is part of the outside tube, and you cut off the supply by screwing this around, and not by revolving the whole burner as in plaintiff's; now, I tried two or three of these Horace R. Barker burners this morning. I paid most attention to the burner Mr. Barker said was the oldest; in this burner you have got a tube, and you have a bat's-wing burner—and that is alike in all three—plaintiff's, defendants' and this one; through the sides of this tube, instead of leaving a lot of little holes like these are in the plaintiff' and defendants', we have a slit; it is a hole of a different shape; it comes to the same thing; it lets gas out from the inside into the surrounding tube; now, outside of this bat's-wing there is a tube, and this tube is like the plaintiff's and the defendants' tubes; when you use the burner in this condition, the condition in which I used it this morning, you, gentlemen, will all see there is a bat's-wing burner with an open ring around it, and the burner burns with the same flame as the other
103 two when in the same condition. I had all three burning at once; they all burn the same kind of flame; now when you want to regulate this burner, you regulate it by turning the outside tube and by letting the bat's-wing stand still, and in this respect, this is like defendants' and not like plaintiff's burner; also in this burner there is no separate piece making a valve; the valve is the outer tube which forms the outer boundary of the ring of gas; in that respect this burner of Horace Barker's is like defendants' and unlike plaintiffs; there is another respect in which these burners are like defendants' burners; while you are altering the quantity of gas flowing out through this outside ring, the bat's-wing stands still, and the ring moves up and down, while in the plaintiff's burner, when you are altering the supply, the annular ring is stationary and the bat's-wing turns around.

This burner has not got any tubular valve, like the plaintiff's burner, but, on the contrary, the valve is the outside tube, same as the defendants', except that in the defendants' the valve is at the bottom, and in

this it is at the top; it has a tube outside like both; it has the valve on the outside, like defendants', and has not got a separate valve like plaintiff's; in this burner, when you want to shut off the gas going through the outside ring, you put it in that position, you will see that the outside hole is shut up, and it burns like a common bat-wing burner; in this burner, although you may decrease the slit in the bat's-wing by screwing it down, the principle is, when this valve goes down, to shut off all the escape of gas before you begin to shut up the slit in the bat's-wing.

Q. I want you to state whether you have examined the patent of the plaintiff, and what you say is the difference between a burner made according to the specification in Clough's patent and the burners made by the defendant and Horace Barker.

104 A. The burner described in Clough's patent, the defendants' burner, and the Horace R. Barker burner are all burners which have a bat's-wing, which have holes through the burner tube below the bat's-wing, and which have an enclosed tube around the bat's-wing, and they will all burn with the same kind of flame; in those respects all the three burners are exactly alike; now, the plaintiff's burner—Clough's burner—has a tubular valve, through which all gas passes; that tubular valve does not exist either in the defendants' or in the Horace Barker burner; the Horace Barker burner has a valve which is a part of the outside tube; the outside tube moves up and down on the bat's-wing; the defendants' burner has a valve, which is, in fact, the outside tube, the same as the other one, and which opens and shuts by moving up and down, as in the Horace Barker; in the Horace Barker burner the valve is at the top and outside of the bat's-wing, and in the defendants' burner the valve is at the bottom and outside of the bat's-wing; in the plaintiff's burner the valve is inside the tube, and, as I said before, the burner is composed of three pieces, while the defendants' and Horace R. Barker's are composed of only two; as far as their operation is concerned, irrespective of mechanical devices, I mean so far as the effect in the shape of the flame produced and in the capacity of cutting off and regulating the hollow cylindrical jet of flame is concerned, the three burners are exactly alike.

Q. (By a JUROR.) The only difference is in construction?

A. The only difference is in construction.

Q. Is the tubular valve new or old?

A. The tubular valve, by itself, is a very old device; but I don't understand that the patent was granted for the tubular valve.

Cross-examination:

105 Q. Will you examine the plaintiff's Exhibits A and B, and see if you can't regulate the supply of gas to that burner without turning the flame around?

A. Yes, sir; I can.

Q. Now, in both the defendants' and the plaintiff's burners, the size of the aperture at the top of the burners always remains the same?

A. It does, sir.

Q. Both burners have a surrounding-tube conducting the exterior supply of gas to the flame?

A. Yes, sir.

Q. Now, in regard to the Horace R. Barker burner, why does not the spring continually press against the outside tube, however high it be screwed up?

A. The reason is very evident; this burner pillar is cast brass; after

this cap has been screwed on a few times to shut up the slit, as we all know a gas-burner gets intensely hot, and the little temper it ever had in it is entirely taken out, and it ceases to be a spring. I found I could bring this top down so that the ring fully cut off all outside supply, and I could not detect any variation in the size of the bat's-wing.

Q. That was the intention to open and close the slot—was it not?

A. It was, sir.

Q. That was the principal design of this invention?

A. That was the design of the invention, but I do not say it was the principal design.

Q. The spring failed?

A. Yes, sir.

Q. Here is one which I understand has been in use five years—see if that has any such qualities?

A. Not in its practical operation—but you will notice now that the size of the slit in the bat's-wing is not at all changed, and the outside tube is so far down that you can't screw it down further; it must, whether springy or not springy, have always worked with the outside tubular flame; when it was new I have no doubt that it increased
106 and decreased the slit as you increased or decreased the tubular flame, but after working a little it would cease to affect it.

Q. Was not the main office of the Horace Barker burner, as described in this patent, to widen the slit in the bat's-wing burner, for the purpose of permitting a larger amount of gas to escape?

A. He states the fact; by the use of this tube he can increase or diminish the size of the slit.

Q. You have got a narrow slit and want to make it wider; and what he does by his invention, originally designed, is to widen the slit in the bat's-wing burner?

A. He must have had the tubular flow; you can never take a small circle and spread it out and make it fit a larger one; so he must always have had the flow outside the bat's-wing burner.

Q. (By the COURT.) Will you examine the plaintiff's Exhibits A and B and compare them with Exhibits D and E—D and E are the defendants' burners, as manufactured by him—and tell the jury whether there is a substantial difference?

A. Well, sir, I say these burners A and B, made by the plaintiff, are substantially alike burners E and D made by the defendant.

Q. Will you examine the plaintiff's patent and see whether A and B, in your judgment, are embraced within the plaintiff's patent?

A. Burner B would be—I don't know how to put it—would contain the invention set forth in the first claim, but would not contain the invention set forth in the second claim; this contains both (showing Burner C).

Q. That contains both A and B; in short, have not the tubular valve, and the question is whether A and B are described in the plaintiff's patent.

A. Well, sir, I should say they were, as far as the first claim is concerned.

Q. Do you consider the tubular valve as a material or immaterial part of plaintiff's alleged invention?

A. I consider it a material part of the second, but not of the first claim; if I was to make a burner like the second claim I should have what is set up in the first claim; it is not my business to ex-
107 press an opinion as to the validity of the first claim; that is matter of law.

Defendant calls as a witness ISAAC A. BROWNELL, who, being duly sworn, testified:

Q. Where do you reside?

A. Providence, Rhode Island.

Q. What is your occupation?

A. Solicitor of patents.

Q. To what extent have you been engaged as expert in patent cases?

A. I have been a solicitor of patents in regular practice for 14 years, and during that time I have been quite a number of times called upon to testify in the courts and cases of reference, as a mechanical expert.

Q. Have you made mechanics a study?

A. I have learned the trade, and followed it as an occupation ever since I left school.

Q. Have you had any experience in patent cases where gas-burners were in question?

A. I don't recollect any instance where I served as an expert on a case involving gas-burners; I have obtained a great many patents for gas-burners, and investigated the case thoroughly.

Q. You have obtained patents for gas-burners?

A. Yes, sir.

Q. Have you examined, Mr. Brownell, this burner of Clough's made by the plaintiff, and do you understand its operation?

A. Yes, sir; I have examined this a number of times.

Q. You remember its operation and effect?

A. I do, sir.

Q. You understand the use of this air-gas, and its variations—you have examined that subject?

A. Yes, sir; I understand it, and I have tested quite a number of burners with the gas.

Q. You have also examined defendants' burner, Exhibit D?

A. Yes, sir.

Q. Also the Horace Barker burners?

108 A. Yes, sir.

Q. Seen them all in operation?

A. Seen them all in operation, and operated them myself.

Q. Describe to the court and jury in what respects they agree and differ.

A. These burners are regulated burners—that is they are adapted to be variable, according to the richness or poorness of the gas—all of them without exception. The plaintiff's burner, which is marked C, consists of a bat's-wing burner, perforated at the base, with an outside shell surrounding the burner and admitting of the conveyance of gas through the perforations at the base outside of the tube, and that outside or supplemental additional supply is regulated by a tubular valve—a certain kind of valve which the inventor has adapted to the other part of the structure; the valve is described in the patent and consists of this little piece, which is a tube, which goes up on the inside and opens or closes these holes or perforations, which he has made in the base of the burner. This burner, is not, perhaps, of the cheapest construction; it is made up in four pieces and it is rather objectionable on that account. The defendants' burner, which is marked D, is made in two pieces, and there is no tubular valve here—the burner is put on to the pipe.

Q. Can one be made cheaper than the other?

A. Without any doubt; that is obvious to any one; the burner can be

screwed on to the pipe; an outside tube or shell will admit of the gas passing out into a recess, represented on the outside by that bulb or enlargement; in that way the gas passes out through these openings.

Q. Is that a tubular valve?

A. It may perform the functions of a valve, but it is not the tubular valve which the plaintiff puts in his; it is more like a gate—molasses gate, or something of that kind; it is a different structure, I
109 consider, than that element which is a very essential one, so pronounced in the patent, and so seen by any one who looks into it; that tubular valve is entirely wanting in this device—does not exist there; the Horace R. Barker burner I examined; I put it myself upon a suitable testing-pipe connected with this air-gas, and tested them myself—tested them in connection with both of these other burners; I tested those all upon one pipe, one after the other, and by each other; there seems to be no difference in the result; in burner C, when those holes are closed, there is the plain bat's-wing burner, such as is familiar to almost every one, and on lifting this, by screwing up this—raising it off from the valve on the seat—a circular flame rises up around the tip; soon is visible a blue flame, and above it one of a yellowish tint, but the shape of the flame is changed to what is called a torch flame; the same is the case with the defendants' burner D, and so also with the Horace R. Barker burners; by easing the end of the outer tube from the projecting portion of the burner that same flame made its appearance and affected the bat-wing flame in the same degree; we could not tell anything about the comparative brilliancy, because that slit (H. R. Barker's) is larger than the others; we could only judge by the general appearance and color of the flame.

Q. Could you see the ring plainly?

A. Yes, sir; it was more perceptible in the Horace Barker, because the screw thread is coarser and requires but a very slight turn to open that considerably. We did not know that at first, and got it a little too much turned.

Q. Is the coarseness or fineness of the screw any material part?

A. O, not at all. I will say about this gas, they supply material to serve it once in six weeks to three months—sometimes six months.

Q. Please state whether, in your opinion, the arrangement for
110 increasing or diminishing that supply of gas by means of the valve, if you call it a valve, on the burners of Horace R. Barker and the defendants is not substantially different from the tubular valve described in the complainant's patent.

A. I consider the valve of the Horace R. Barker, and the defendants' model, is different from what is used by the plaintiffs.

Q. You consider that this valve is different—consider it's a different device?

A. Yes, sir.

Q. Are you acquainted with the various descriptions of burners used in burning coal-gas?

A. I am with a great many of them.

Q. Please state to the court and jury whether or not any of these elements contained in the complainant's patent were new at the time of Clough's patent, when taken by themselves?

A. I will say in reference to all, that I consider them old, taken by themselves. There have been a large family of burners patented. I am acquainted with some we had in other gas-burners, as, for instance,

the tubular valve is a well-known device. It is described in the patent of F. Lunkenheim.

Q. You were speaking of tubular valves; tell us if you have seen that device before?

A. I have seen those before.

Q. What patent was that?

A. That is the patent of F. Lunkenheim. On removing the outer shell of the burner there is a tubular valve which shuts down in the beveled seat and regulates the flow of gas.

Q. You have seen burners of that description; and that description of tubular valve was old at the time of their patent, was it not?

A. Yes, sir.

Q. Look at this one of Mr. Gleason's, and say if you knew about that?

A. Yes, sir; I have seen that before, a number of years ago.

111 Q. Is that a tubular valve?

A. I don't know that I should call that a tubular valve.

Q. That is a different device for allowing the escape in the interior of the burner?

A. Yes, sir.

Q. And there were a great variety of these in use before 1870?

A. Yes, sir.

Q. So, in regard to a surrounding-tube to regulate the quantity of flame at the top of the bat-wing, was that new of itself?

(Objected to.)

Q. Just state the cases of a surrounding-tube which you have known prior to 1870?

A. I have known a case of a surrounding-tube—the Soliday patent—which I don't recollect the date of.

Q. How is it as to perforations in the base of the burner-tube?

A. They were known long ago, as I understand it.

Q. How are they, new or old?

A. I knew of those. There is one in G. R. Brigg's patent of '67; a burner that was made exclusively in Philadelphia.

Q. Have you seen them?

A. Yes, sir. Tested them in '67.

Q. Have you examined the patent of the complainant, and the specifications?

A. Yes, sir.

Q. Have you it before you?

A. I have it before me.

Q. Do you find described in those specifications any burners such as the burner the defendants make?

12 A. I do not, sir; I find a certain structure described minutely and particularly, and the description agreeing with the drawing. The whole scope of the specifications seems to be limited to what is shown in the drawing—the construction and the order of arrangements, and there is no intimation that it is susceptible of any other construction or arrangement, or that any particular assemblage of parts——

(Objected to as irrelevant.)

The COURT. I think he can say if he finds the defendants' Exhibits D and E described in those specifications.

WITNESS. I don't find them.

Q. Do you find any burner described there except the burner mentioned in the last claim, of which Exhibit C is a correct representation?

A. I do not.

Cross-examination:

Q. Mr. Brownell, you said that the defendants' burner had no interior tubular valve like letter C, but that it had a mechanism that operated in the same manner?

A. Served the purpose of a valve.

Q. Is not the only difference this: that in the one the valve acts on the outside and in the other on the inside of the bat-wing tube?

A. The structures are different; one is not adapted to the other.

Q. You say you don't find in the complainant's specifications and drawing the burner described which was made by the defendant. I will call your attention to the testimony of Mr. Renwick, and see if you don't find a part of that described there. State how much of that burner you find there in the first or second part of complainant's claim.

A. I don't find it in the first claim.

113 Q. Do you find in the complainant's patent there, any specification, drawing, or description of a bat-wing burner perforated at the base?

A. In the description I find it; yes, sir.

Q. Do you find anything there about that bat-wing burner being surrounded by a shell or tube?

A. It is surrounded by a shell or tube, but not that one.

Q. Please point out the difference?

A. This surrounding shell or tube on Ex. C don't have anything to do with the regulating device at all.

Q. Do you not find it surrounded by a shell or tube screwed on to it?

A. Yes; but I don't find it surrounded by the shell or tube in the specification.

(Mr. Yeamans reads from specifications.)

WITNESS. You might solder that shell on Exhibit C, but you can't solder the other one on. That says, "it may be attached in any suitable manner." That shell on Exhibit D could not be soldered on there and perform all the functions of that kind without changing its whole construction.

Q. You never saw these burners in operation, did you?

A. I have; all of them.

Q. You did since you came here?

A. Since I came here and before.

Q. When did you first see them?

A. I saw the one that has Mr. Barker's initials on it three years ago—about 3 years ago; I can't give the exact date.

Q. Did you find that those burners, when you regulated the extra supply, also close and expand the slit in the bat-wing burner?

A. It may to a hardly perceptible degree.

Q. That was the design?

A. Yes, sir.

Q. Whereas in the burners both of the complainant and defendants that remains stationary?

114 A. There is no widening nor narrowing of the slit.

Redirect examination:

Q. Are the specifications in complainant's patent sufficient to enable a skilled mechanic to make a burner like the defendants' burner?

(Objected to by complainant's counsel. Objection overruled.)

A. He could not without further invention.

Mr. Stanley then read in evidence the patent of Mr. John F. Barker,

under which the defendants' burner was made, dated the 26th day of July, 1870, a copy of which is hereto annexed.

JOHN F. BARKER recalled; examination resumed by Mr. Stanley:

Q. Is Mr. Gilbert in town?

A. I don't think he is.

Q. Was he when you came to court this morning?

A. No, sir.

Q. Where is he?

A. In Baltimore.

Q. He has not been here since the commencement of this trial, has he?

A. He has not.

Q. At your places of business how long have you been engaged in the manufacture of gas-machines?

A. For about twelve years I have been engaged in introducing pipe and fittings for gas and the fixtures and other works for steam and water of various kinds.

Q. And putting them up?

A. Putting them up.

Q. What was your employment immediately before your engaging in the gas-machinery business?

115 A. For nearly four years during the war I was in the United States armory, at Springfield, Massachusetts, and was in charge of the steam, gas, and water works at that place.

Q. As superintendent?

A. Yes, sir.

Q. In that building did you use gasoline gas?

A. Yes, sir; there was gasoline gas used for supply' about 1,100 burners.

Q. Since what time have you been entirely in the gas-machine and gas-burner business?

A. I first engaged in the gas-machine business in December of 1865.

Q. In regard to this burner which you patented had you seen before you made your arrangement the burner which was patented by Mr. Clough?

A. I had.

Q. Were you at work at the same time getting up a gas-burner?

A. I had been at work off and on for three years, I think, and experimenting with burners of various kinds to see whether they could be improved for the burning of air-gas.

Q. Will you state to the jury what time you spent, so far as you were concerned, in getting up a gas-burner in your experiments which finally resulted in the gas-burner which you produced?

(Objected to as immaterial.)

Q. Will you state whether or not there is, in your opinion, any description in Mr. Clough's patent which would enable you to make the burner which you made?

A. There is no description in Mr. Clough's patent which would enable me to make the burner which I did make and patented; when I invented that arrangement which I patented I was engaged exclusively doing nothing else for two weeks but in having experimental burners made; I made a large number of different models of burners, and had considerable bother in getting castings; during that time I kept a man constantly at work on a lathe, making different models for

116 burners, making them many different shapes, and spent two weeks exclusively at it.

Q. Will you please state as to the relative expensiveness or cheapness of the two burners; the one patented by you and the one patented by Mr. Clough?

(Objected to as immaterial.)

The COURT. I don't think that the mere item of expense would be decisive in this case or a turning point in the case. There is no question but that Mr. Barker's burner is cheaper.

Q. Prior to the time that Mr. Clough's burner was made or your burner was made, won't you give the jury some general idea of the burners that were in practical use, and their various parts?

A. The burner which was ordinarily used or commonly used when I first commenced to construct gas-machines was in the form of the ordinary bat-wing burner, having a curved slot not differing from the shape of that used for coal-gas; and such burners were commonly used in mills and manufactories of all kinds when an open light was desired, and they are still used in buildings of that kind; their utility has never ceased practically, and they are used in preference to any other burners to day in many cases; these common bat-wing burners are put in various forms, some with leaden-pipes, others with iron or brass; the only material difference in them was in the shape of the tip; it was found that air-gas needed something different—a different orifice from what coal-gas required, to be successful—and therefore the attention of burner-makers was called to the idea of getting an orifice of a suitable shape, different from those which were used for coal-gas; after a time it was found to be absolutely necessary to a proper shape of flame to have a burner different from the common coal-gas burner. Mr. Horace R.

117 Barker sent me some samples of his burners some time in the fall of '68; perhaps a half dozen or less; I used them in various ways and in various experiments, and thought they might be improved in some respects, and I took the common burner from time to time, and improved it in many ways, and it resulted in making the shape of the common burner with an improved orifice. I called the attention of makers to the orifice or burner many times; the demand for an improvement upon the ordinary bat-wing burner increased for use in private houses, hotels, and certain specific classes of property, and the attention of burner-makers was particularly called to the necessity of having an adjustable burner which would answer the purpose, and to that end I made experiments to some extent with the H. R. Barker burner; not very many, however, because my time was very much limited, indeed. I continued in that way until the early spring of 1870, and in the mean time I had seen the burner made by Coolidge; I saw that in operation, and it was spoken of as giving very good satisfaction; and finally, in the spring of 1870, I commenced my efforts to construct a burner which should be better and which should be cheaper, and which could be used in all places, better and cheaper than any I had ever seen before, which could be used in most of those places where a bat-wing burner had formerly been used, and it resulted in the production of this burner which I have patented, and which was cheaper to make and superior in its operation in every particular, and it filled a want which had long been felt.

Q. Mr. Tirrell testified something in relation to its being a new thing to burn two flames together; what do you know about that?

A. I have seen two flames brought together in bat-wing gas-burners

as long as twenty years ago; there are numerous burners constructed, both fish-tail and bat-wing.

(Objected to.)

118 Twenty years ago I saw burners constructed having two small pipes set into a pillar or an angle, the two flames being brought together at the tip; in 1867 there was a bat-wing burner constructed which had two slits sawed into its tip, on an angle, in such a manner that the gas should pass over each slit of the burner together; in fact I have seen burners wherein the gas was brought through an independent tube from the seat connected with the burner to the tip of the burner; that is a very old idea, indeed, the procuring of an independent supply of gas and mingling it with the flame in the combustion of coal-gas.

Q. Have you seen burners with tubular valves in them, in the interior of the burner, prior to 1870?

A. I have seen a number of them.

Q. Seen them in use?

A. I have.

Q. Please explain to the jury what your idea is of the agreement or difference in the construction of burner C, according to Mr. Clough's patent, and your burners D and E?

A. The plaintiff's burner may be said to be an ordinary bat-wing burner, or a burner having the orifice of an ordinary bat-wing burner, with a series of perforations in the burner tube; on the burner tube there is a screw having something of an elevated shoulder, which is made to attach to the stationary tube, which is larger than the pillar of the burner. The perforations extend from this pillar of the burner through the inside of the tube which surrounds the burner. In addition to what I have already described there is a tubular valve so constructed that the end of the valve impinges against the seat of the burner-tube, and when it is screwed down to this seat it forms a simple bat-wing burner, having a continuous passage from the gas-pipe to the tip of the burner, like any ordinary bat-wing burner, having no external supply of gas whatever; and it may be worked that way for months at a time. When an extra supply of gas is desired, or

119 a supplementary supply of gas, from the perforations in the tube of the burner, the burner is screwed up, the seat is raised from the valve, and the gas passes through the perforations in the burner tube in greater or less quantities accordingly as the seat is drawn away from the valve, and is conveyed through the outside tube to the tip of the burner. So much for the burner which the plaintiff describes. Burners E and D, the arrangement of which I invented, and in which letters patent were granted, consist of a burner pillar in which may be placed a bat-wing or fish-tail tip; it has an outside screw at the base of the pillar for the purpose of attaching an outside tube; it also has a series of perforations in the outer part of the pillar, through the screw, into the interior. It has no tubular valve, no independent valve of any name or nature, but the outside tube, which screws over the perforations, operates to close up the perforations when a supplementary supply of gas is not desired to feed the tip of the burner, thus dispensing with the tubular valve and its expense and complication in every particular, making an entirely new and distinct device of it in every respect. It has no seat, what may regularly be termed in mechanics a valve seat, nor any valve disc. These are the principal points of difference in the construction; the results are practically the same, namely, the conveying of gas to the

tip of the burner, and like results have been secured with burners of different constructions.

Q. Did I understand you that these Horace R. Barker burners had been used in your shop at Springfield?

A. They have been.

Q. For how long?

A. I think I first made use of them in November or December, 1868.

Q. What do you say as to the operations of the Horace R. Barker burner in your shops?

120 A. We put those burners in use, what we had of them, some time in 1867 or 1868, I think, or thereabouts, and we continued to use them until I made my invention, or my improvement in gas-burners.

Q. What do you understand to be the operation of that Horace R. Barker burner?

A. I understand that the Horace R. Barker burner is a bat-wing burner with a perforation at its base and then a surrounding-tube. The pillar of the burner, however, has a cone near the tip, that the burner operates not only to allow gas to escape from the tip, but the surrounding-tube is reversed. From its conical seat a supplementary supply of gas is passed through the surrounding tube and in contact with the gas which escapes from the bat-wing tip. This very burner, as a matter of fact, was in operation in our factory at Springfield in 1868.

Q. Is that perforation at the base of that slit closed, as a matter of fact, by closing the tube?

A. The perforations at the base of the burner remain open when the tip of the tube is closed.

Cross-examination:

Q. When did you spend two weeks in trying to perfect a burner? How long before you got your patent?

A. To the best of my knowledge it was in February or March, 1870.

Q. You had seen your brother Horace R. Barker's model and invention some time before you commenced work?

A. I had.

Q. You do not regard it as the same as yours?

A. I regard it as a different device.

Q. You regard yours as being a better one?

A. I regard my burner as being cheaper to make.

Q. A better burner, is it not?

A. Yes, sir.

121 Q. Do you consider the Horace R. Barker and Coolidge burners as being practically the same; or have you examined the Coolidge burner?

A. I have.

Q. What is your judgment about that: are they about the same?

A. I consider that they give, practically, the same results, though the devices are somewhat different. The degree of result, however, may be somewhat different, but the result in a certain degree is the same.

Redirect:

Q. What would be the practical operation of the Coolidge burner that you have in your hand?

Mr. YEAMAN. Ask him, first, if he ever used it.

Q. Have you ever used any Coolidge burners?

A. I have seen them used and seen them operated. I understand

the operation of this burner to be that when the surrounding-tube is turned in a certain direction, that might be termed a right-handed direction, it closes to some extent, though not entirely, the bat-wing orifice of the burner, and also closes the space between the lower side of the burner-tip and the surrounding-tube, which would be done in practice when a less volume of gas is desired. A less volume of gas might be desired when the gas was very rich and a small quantity would give a strong light; when the gas becomes poorer it might be necessary to increase the flow of gas, which would be done by turning the surrounding-tube in a left-handed direction, which also turns the burner tip. The effect of turning it in that direction would be to allow the spring to open to some extent, and to make an opening between the tip of the burner and the top of the tube, greater or less in extent, depending on how much the tube was turned. A very large quantity of gas would escape if it was turned back far enough.

Q. Outside of the burner?

122 A. Outside the burner pillar. There is a very large opening in that, large enough to allow the gas to escape; and the degree of that opening varies according as this tube is turned.

Recross:

Q. In the Coolidge burner, was it not intended that the ring or clamp should be very tight—gas-tight, working around a conical valve?

A. I don't know that I know what the intention was in the premises.

Q. Is it not true that the escape of gas in the Coolidge burner, between the stem of the burner and the ring, is a mere accident, or a defect of construction?

A. I should not say it was a defect of construction; I should say, if anything, that the inventor of the burner had accomplished something more than he contemplated at the time he invented it.

Q. Do you know that he does not claim that in his patent?

A. I do not.

Q. Have you read it?

A. I don't know that I have; but if I did it is some years ago.

Q. (By a JUROR.) Had you seen Clough's patent before you made your application?

A. I had; as I had seen pretty much all the patents that relate to the burning of air-gas.

Defendants rest.

In rebuttal.

HIRAM S. MAXIM recalled by plaintiffs:

Q. Take the two burners, the Horace R. Barker burner and

123 the Coolidge burner, and state their construction, mode of operation, wherein they differ from and wherein they resemble the burner of the complainant in this action.

A. I find that the Horace R. Barker burner consists of a bat's-wing burner, having a particular shaped slot sawed down in such a manner that it is adjustable, that is, can be made more or less open, according to the distance that a ring is screwed down upon the top. From what I can see of it there is no annulus at all in it. I also see that the ring touches lightly all the way around.

Q. Wherein, if at all, does that differ from the Coolidge burner?

A. The Coolidge burner opens and shuts the same jaws, or slot, by working against an inverted cone, whereas this is a cone right side up;

that is the only difference. The object of this ring is to clamp that together and prevent a leakage of gas. Gas escapes through the slit with at least ten times the velocity that it does through the annulus.

Q. Take the Clough burner and state wherein it will give different velocities to the two different supplies of gas in the Coolidge and Horace R. Barker burners.

A. The character of carburetted air, or air-gas, as it is called, is such that if it issues with sufficient force to spread the flame, it will incorporate with itself enough atmospheric air to make a flame. The vital point, as it seems to me, in the Clough burner is that the gas comes through at two different velocities. That feature being once shown, I, as a mechanic, would not require only the suggestion of the thing to make a hundred modifications of it. I could make it all in one solid piece.

Q. Have you examined the specifications?

A. I have. The burner C handed to me was exactly in accordance with the specifications.

Q. Examine these two Clough burners, marked A and B; compare them with the drawings, specifications, and claim of Clough's patent, and say which of those burners is found in the specifications.

124 A. Both of these burners are made in accordance with Mr. Clough's drawings and specifications, in one portion of it, not the whole. His specifications sometimes specify rather more than is necessary.

Q. (By the COURT.) Have they an inside tubular valve?

A. Yes; I would call it a tubular valve. It is on the other; it is shut off with a sleeve.

Q. Is not the only difference that in this one the tubular valve comes upon the inside and closes up the orifice from the inside, while in this one it is closed from the outside?

A. I would say if this Exhibit C is a tubular valve, this one, Exhibit A and B, also is. This burner B, I should say, is identical with Mr. John F. Barker's burner, although not quite so long. The only difference is, that one has a lava tip and the other has an iron one.

Q. Look at the Lunkenheim burner and say if you ever saw that before.

A. I should not call that a burner at all.

(After further examination.) It is an adjustable check bat-wing burner, supposed to burn under a certain amount of pressure. There is no annulus in any one of these burners produced except Mr. Clough's.

Q. Explain to the jury what you mean by an annulus.

A. An annulus is a passage that is circular in form, while a slot is a rectangular orifice.

Q. In that Lunkenheim burner do you find anything in construction, mode of operation, or results produced, that corresponds with the Clough burner?

A. It does not resemble it in any manner whatever. The gas simply escapes through a slot or slit. That, I see, is simply a new kind of adjustable check inside, which I never saw before.

Q. Look at Exhibits D and E, and say whether you could make them from the specifications and drawing in Clough's patent.

125 A. I would only require to know the fact, after I had ascertained that an outside jet of gas spread by an inside jet at a high velocity was necessary to produce the light; that is all I would ask for. I would ask for no drawings. The only difference is, one allows the gas to escape from the inside to the outside.

Q. Could a competent workman take Mr. Clough's drawings and specifications and make the burner which you have in your hand—Barker's?

A. I could explain it to a man so that he could make one like this. I should expect him to make one like this, C, and not like this, D. I should think a man of ordinary intelligence, by seeing that drawing, would make these two pieces together—make the outside of one piece. I should think any man ought to be able to do that. I should think a man was stupid who would not have brains enough to make the outside of one piece.

Cross-examined:

Q. It would be rather your inference that a man who could not make it must be a very stupid man?

A. My experience is, that mechanics in New York are very stupid men.

Q. If you explained to him how to do it, he could do it?

A. Yes.

Q. Won't you please look at that patent and state where you find anything in there about different velocities of gas?

A. It is shown in the drawings, but not in the specifications. I told Mr. Clough his specifications were very clumsily drawn, and I advised him to get a reissue.

Q. Show the velocity in the drawings to the jury. (Witness exhibits drawing to the jury.)

Q. There is nothing about velocity in the language of the specifications?

126 A. There is nothing in the specifications about it, nothing that I can see.

Q. Do you consider that a vital matter in the patent?

A. Yes, sir; no steady flame can be produced where both jets issue with the same velocity.

Q. What do you say as to there being a valve on the top of that, Horace R. Barker, or not?

A. It looks very much like one.

(Question repeated.)

A. No, sir; it is not a valve, it is simply a clamp.

Q. And you say this is on our burner?

A. Perhaps it is.

Q. You said it was?

A. I find there are several orifices.

Q. I understood you to say so; it is or it is not, which is it?

A. I would say it is a tubular valve; perhaps that is a good name for it.

Q. Still you say it is not?

A. No, sir.

Q. Does it not, by screwing up or down, enlarge or diminish the space between this tube and this external shell?

A. There is no space at all; it is supposed to be an air-tight joint.

Q. Is there not a space there?

A. That appears to have been stretched out from some cause.

Q. Is there not a space there to allow the escape of gas?

A. Yes, there is now.

Q. Did you ever see one of these Horace R. Barker burners before this?

A. No, sir.

Q. Not one?

A. I never have.

Q. Still you undertake to say, do you, that no gas can escape when this is screwed up here?

A. I don't doubt there would be some escape.

127 Q. Will you explain to me why the velocity should not be slower outside of that inside burner-tube than it is in the interior, when it comes through that slot, down through the base?

A. The form of the slot allows a much greater flow of gas than the annulus, consequently the gas would not be retarded in coming through.

Q. Be kind enough to refer to the first claim in Clough's patent, and tell the jury whether that burner is described in that first claim.

A. "The bat-wing burner, perforated at the base, in combination with the surrounding-tube, substantially as described."

Q. Does that describe any method of shutting off or increasing the flow of gas?

A. The claim seems to be broad; it don't say anything about the particular manner of doing it.

Q. Refers back—"substantially as described"?

A. Yes.

Q. Is not the description in the specifications that of a stationary tube?

A. It only describes it in the manner shown in the drawings.

Q. That represents it to be a tubular valve?

A. It claims the thing broadly, I should say.

Q. Represents it to be a tubular valve?

A. There is nothing said about a tubular valve in the claim, but he seems to have claimed it broadly.

Q. Leave out the tubular valve, as that is not referred to in the words of the claim, and would not the tube be stationary?

A. One piece necessarily would have to turn; it is done inside instead of the outside revolving, the whole burner revolves on the tube; the inside revolves, and the outside remains stationary.

Annexed hereto are the exhibits read in evidence, as follows:

1st. Complainant's patent and specifications and drawing.

128 2d. Defendant John F. Barker's patent, specifications, and drawings.

3d. Horace R. Barker's rejected application for patent, with specifications and drawings.

4th. Complainant's Exhibits A, B, C, D, and E.

5th. Complainant's Coolidge burner.

6th. Defendants' Horace R. Barker's burner.

7th. Defendants' Lunkenheim burner.

8th. Copy from file-leaf of complainant's patent, Exhibit H.

9th. Drawings made by Maxim, Exhibit III.

Both parties having rested, the defendants' counsel requested the court to charge the jury—

First. That the first claim in complainant's patent is void, because no such burner as is there claimed is shown and described in the drawings and specifications, and because such a burner as is claimed would be complete and inoperative for the object which the complainant claims in his specification, to wit, an adjustable burner adapted to the use of air-gas of variable richness, and the defendants are entitled to a verdict on that claim.

Second. That if the jury believe that a burner made in accordance with the complainant's first claim in his patent, and without a valve, was and is destitute of utility for burning air-gas of variable quality, then the first claim in complainant's patent is void.

Third. That the alleged improvement which is specified in the 1st clause of complainant's patent is a combination of two instrumentalities merely:

129 1st. A bat-wing burner perforated in such manner as to permit gas to pass from its interior to its exterior; and

2d. A tube surrounding said burner in such manner as to receive the gas from the perforations of the burner, and also open at the top; and if the jury find that preceding the date of this patent any burner existed having a bat-wing burner and surrounding-tube combined together in substantially the same manner so that the gas would pass through the perforations of the burner into the surrounding-tube, then the patent is void as to the 1st claim, and the verdict as to that claim should be for the defendants.

The defendants' counsel requested the court to charge—

Fourth. That the alleged improvement which is specified in the 2d claim of complainant's patent is a combination of three instrumentalities: First, a bat-wing burner perforated in such manner as to permit gas to pass from its interior to its exterior; and, secondly, a tube surrounding said burner in such manner as to receive the gas from the perforations of the burner, and also open at the top; and, thirdly, an adjustable tubular valve for regulating the burner; and that if the jury find that preceding the date of this patent any burner existed, and was used in this country, having a bat-wing burner and surrounding-tube, and tubular valve combined together, in substantially the same manner as in the complainant's burner, and so that the supply of the gas exterior to the burner stem to the tip operated and was regulated in substantially the same manner as in complainant's burner, then the defendants are entitled to a verdict on the 2d claim.

Fifth. That the alleged improvement specified in the second
130 clause of this patent is a combination of the following instrumentalities: First, a bat-wing burner perforated, so that the gas can pass from its interior to its exterior; secondly, a surrounding-tube open at its top; and, thirdly, a tubular valve for regulating the supply of gas through the perforations of the burner. That if the jury find that the defendant has used two of these instrumentalities without the third, then there is no infringement of this claim and a verdict should be on it for the defendants.

Sixth. That if the jury find that the defendants have not used a tubular valve substantially the same as that designated by their letter C in the patent, then there is no infringement of the second claim and their verdict on that claim should be for the defendant.

Seventh. That the combination recited in the 2d claim of the patent does not consist of every combination of a bat-wing burner perforated at its base with a surrounding-tube, a valve of every description, but of the particular combination of a bat-wing burner perforated at its base, surrounding-tube, and tubular valve described in the said patent, and unless the jury find that the defendant has used in substance the said combination, then there is no infringement and the verdict should be as to the 2d claim for this defendant.

Eighth. That the question whether the defendant does or does not use a tubular valve for regulating a supply of gas is a question of fact for the jury to determine.

Ninth. That the question whether defendant does or does not use an equivalent for a tubular valve operating in the same manner as the tubular valve described by the patentee is a matter of fact to be decided by the jury.

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Tenth. That if the jury find that the defendant uses a bat-wing burner perforated at its base, a surrounding-tube, and a valve, tubular or otherwise, and that these three are combined together in a manner substantially different from the manner in which they are combined in the complainant's patent, then the verdict as to the second claim must be for this defendant.

Eleventh. That if the jury find that the defendant has used a bat-wing burner perforated at its base, a surrounding-tube, and some new device for regulating the supply of external gas, which new regulating device was not a known equivalent or substitute for the tubular valve of the patentee at the date of the patentee's invention, then the verdict as to the 2d claim should be for the defendant.

Twelfth. That if the jury believe that each of the several elements of the combination contained in the patent of plaintiff are old, and well known at the date of his patent, then the plaintiff is entitled only to a patent for the particular arrangement of the said elements which is described in his said letters patent, and if the particular arrangement and construction of the elements in defendant's burners is not described in complainant's letters patent, defendant is entitled to a verdict.

Thirteenth. That the patent of the defendants is prima facie evidence that the burner of the defendants is a different burner from that described in complainant's patent.

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The court then charged the jury as follows:

The plaintiff in May, 1871, brought his bill in equity against the defendant before this court, sitting as a court of equity, claiming an infringement by them of his patent dated June 14, 1870, for an improvement in gas-burners, and praying for an injunction and an account.

While a motion for a preliminary injunction was pending it was agreed between the parties and made an order of court that such motion be withdrawn, and that a feigned issue to try the validity of the complainant's said patent be made, and that the following questions be tried at law before a jury:

First. Whether or not the complainant is the first and original inventor of the improvement for which the above-named patent has been granted to him.

Second. Whether or not the gas-burners manufactured by the defendants are substantially identical with those described in the complainant's patent and schedule thereunto annexed in their construction and mode of operation.

I have copied these questions on a paper which I will hand to you, and you will please answer them by your foreman, in writing, on the same paper. The answer to the first question, whether or not the complainant is the first and original inventor of the improvement for which the above-named patent has been granted to him, if you find that he is, will be "complainant is," and if you find he is not, "complainant is not."

Your answer to the second question, whether the gas-burners manufactured by the defendants are substantially identical with those described in the complainant's patent, will be, if you find they are, "that they are," and if not, "that they are not."

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These two questions are the only ones submitted to you by the court,

sitting in equity, and the only ones which in terms you are called upon to answer.

But upon the trial of the case certain questions, both of law and fact, have been raised as to what articles are in fact described in and covered by the complainant's patent and drawings thereto annexed. You will notice the question is whether the plaintiff is the original inventor of the improvement for which the patent was granted. The question has been raised as to what was the alleged improvement for which the patent was granted to him.

It would have facilitated your inquiries had these questions been determined before the issues were presented to you. But as they were not it apparently becomes your duty, under the instructions which I shall give you, to solve them; and, as I shall endeavor to show you before I get through, the solution of these questions practically answers the second question submitted.

The alleged invention of the complainant related to an improvement in burners for burning illuminating gas, commonly called air-gas. It was found by experience that the bat's-wing burner commonly in use for burning coal-gas was illy adapted to air-gas, owing to the variable density of the gas coming from the generating apparatus. At the beginning of the evening the gas would be highly charged with carbon, and the ordinary burner would emit too much gas, and cause smoke; as the evening progressed the gas would become thinner in density, and not enough could be emitted through the unvarying orifice of the burner.

The object of the invention for which the complainant secured a patent was to adapt the slitted or bat-wing burner so that this difficulty could be avoided, and the invention consisted, in brief, in directing two currents of gas, if need be, one through the ordinary burner-pillar and the other through a surrounding tube when necessity required, and guided and directed to the tip of the burner by the surrounding tube.

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He has exhibited to you three models, two substantially alike, called A and B, and a third C, all which he claims to have been covered by his patent, and to be the improvement therein described. A and B do not contain a tubular valve inside the burner-tube, and are admitted to be substantially like the burner manufactured and sold by the defendant. C contains the tubular valve mentioned in the patent, and so often spoken of in your hearing, and hereafter in what I shall have to say, in order to avoid repetition, I shall call the two burners which do not contain the tubular valves A and B, and the one that does I shall call C, and I shall call the defendants' devices D and E, for the purpose of avoiding a repetition of technicalities.

The first question to be considered by you as a preliminary question, is whether A and B are the improvements described in the complainant's patent, and for which it was granted to him.

If you find that they are, then the answer to the second question in issue is a simple one, because it is admitted that those manufactured by the defendant are substantially identical with A and B in construction and mode of operation.

The complainant in his specification undertakes to set forth his improvement under two classes or heads, as follows:

"First. In perforating the base of the burner tube with small holes or passages for gas to escape at the base of the burner, and surrounding the burner with a tube open at the top but closed at the bottom, and united to the burner below the perforations in the burner tube. It is

more convenient to screw the tube to the burner, but it may be attached in any suitable manner.

135 "Second. In regulating the escape of the gas from the perforations at the base of the burner by a sliding tubular valve or cut-off, introduced into the burner-tube at the base, and extending upward within it, the position of the tubular valve being regulated by a screw. These improvements, by furnishing a regulated supply of gas outside of the burner, but directed to the tip of the burner by the surrounding-tube, give steadiness and increased illuminating power to the flame of the bat-wing burner, and make it a desirable burner for burning air-gas." And he makes two claims as his invention and improvement, as follows:

"I claim as my invention and improvement in air-gas burners:

"The bat-wing burner, perforated at the base, in combination with the surrounding-tube, substantially as described.

"Also, in combination with the bat-wing, burner, perforated at the base, and surrounding-tube, the tubular valve for regulating the supply of external gas to the burner, substantially as described."

And he insists that A and B are embraced in the first claim, corresponding with his specification No. 1, and C is embraced in the second claim, corresponding with specification No. 2.

A and B are in terms described in the first claim, but the patent is not valid as to them unless they are properly described in the specification, and this is the question of fact which you are to pass upon.

In a patented combination, such as this article is, it is necessary for the patentee to describe in his specification the parts of which it is composed, the manner of constructing the different parts of the device, their mode of operation, and to point out the new and useful result to be accomplished, so that those skilled in the art and the public may know the extent and nature of the claim, and what the parts are which cooperate to produce the described new and useful result, and to reproduce the thing described from the description itself.

136 The specification must be such as to enable skilled workmen to make the article without invention or addition of his own.

Now, if A and B are so described in the specifications then they are sufficiently described. On this point all the witnesses of the complainant unite in the affirmative. A portion of the witnesses for the defendant concur in the negative. Mr. Renwick was not examined on this point.

If this question of fact is answered by you in the affirmative, it substantially answers the second question put to you, and leaves only the question of novelty to be considered.

But if it is answered in the negative, then you are to determine whether the model C, which is embraced confessedly in the second claim of the complainant, is substantially identical with those manufactured and sold by the defendant.

C is a combination of the bat-wing burner, the surrounding annular tube, and the inner tubular valve—all old articles.

In order for the defendants to infringe upon C they must use the whole combination, which they have not done in form, or they must use the same methods substantially adopted by the complainant, a mere change of form, the adaptation of some equivalent theretofore known, suggested by mere mechanical skill, would not prevent the defendants' burner from being an infringement.

If the change was one of substance and requiring the exercise of inventive power, it would not be an infringement.

This question of fact is then presented to you in this part of the case: Is the defendants' burner a device containing all the material ingredients of the complainant's C, or substitute for one of such ingredients, well known to be such at the time when the patent was granted?

137 If it is, it is an infringement. If it is not, it is not an infringement. As has been said by the Supreme Court: "Mere informal alterations in a combination in letters patent are no defense to the charge of infringement, and the withdrawal of one ingredient from the same and the substitution of another which was well known at the date of the patent as a proper substitute for the one withdrawn is a mere formal alteration of the combination, if the ingredient substituted performs substantially the same function as the one withdrawn."

Upon this matter of fact the plaintiff says that it is immaterial where the tubular valve is, whether inside the burner-tube or outside; that the defendants' burner D and E, like A and B, have a valve outside the burner-tube, and the change was one merely of form; that any mechanic could make it without any inventive skill, and was not a substantial alteration.

That as to its being a well-known equivalent or substitute, that the defendants' theory and testimony is that all these devices of various kinds were all well known, and that one mode was as good as another, and alike antedate the plaintiff's patent.

So that if you find this question of fact in the affirmative, then the second question is still substantially answered in the affirmative, because it is admitted that D and E were made and sold by the defendants, and if they are substantially identical with C, then the second question is answered.

In considering these two questions you must remember that the government has granted the defendants a patent, which gives them a prima facie right to make their burner, and title to its validity.

We come now to the first question, viz:

Whether or not the complainant is the first and original inventor of the improvement in gas-burners for which the patent was granted to him?

He has his patent; that gives him a prima facie title.

138 But it is said that, in fact, he was antedated in the discovery of this invention by others, mainly by Coolidge and Horace R. Barker. I believe that they are the principal if not the only ones. It will not be necessary for me to state any law about public use, because Coolidge's burner was patented and in use, and Horace R. Barker's patent was applied for, so that the question of fact in this part of the case is whether the complainant's burner was antedated by the discovery of the Coolidge and Horace R. Barker burners; that is to say, whether the effect produced by the complainant's invention had been produced in the burner formerly in use by a combination or mode of operation substantially the same as in the burner of the patentee.

Is the change which Clough made a change merely of form, a substitution of a hole for a long slit? Does the change introduce a new mode of operation, or accomplish an effect not before produced?

It is necessary that the Clough burner should be substantially and materially different from H. R. Barker's or Coolidge's; in other words, it must involve some new idea in its construction not found in those.

In construction, mode of operation, and result, are the burners substantially the same, or are they different?

This is the question of fact.

The plaintiff's witnesses say that his burner was a new era in air-

gas burners; that it supplied a long-needed want; that it was a novelty and a success; that previous burners had arisen and passed away, because they had been unsuccessful, and that when Clough's burner came into use it achieved immediate success.

The defendants' witnesses say that the H. R. Barker and the Coolidge-burner were the same thing; that there was in them the surrounding-tube enclosing the burner pillar, and that the gas escaped through the orifice at the top of the surrounding-tube and was projected upon the burner-tip.

139 The complainant says that the object of these two burners, as shown by the patent and the application, was to enlarge the slit in the bat-wing burner by means of a screw and a clamp; that if some gas escaped it was incidental, and not desired, and that in fact in a well-made burner it did not escape, and was not intended to escape.

You have heard the evidence and must determine whether Clough's burner was a novelty, a new mode of operation, and not a mere change of form.

If it was substantially a different thing from the previous burners, you must answer the first question in the negative if not in the affirmative.

The defendants' counsel then requested the court further to charge the jury as follows:

First. That if the jury believe that the second claim of complainant's patent, to wit, a bat-wing burner perforated at the base, with a surrounding-tube and tubular valve, was anticipated by Horace R. Barker's burners or the Coolidge burners, then they must find that the 1st claim was also anticipated by such burner, because the combination set forth in the 1st claim makes a part of and is included in the second claim, and defendants are entitled to a verdict.

Second. That if the jury find that the burners made by defendants have a valve which is a mechanical equivalent of complainant's tubular valve described in his specification, they would not on the evidence be warranted in refusing to find that the Horace R. Baker burner has a valve which is also the mechanical equivalent of complainant's tubular valve, and in that case defendants are entitled to a verdict.

Third. That none of the witnesses for the complainants ever

140 saw one of the Horace R. Barker burners in operation, while Mr. Renwick and all the other witnesses of defendants, with a single exception, testified that they had seen them in actual operation.

Fourth. That if the jury believe that the Horace R. Barker burner contained the entire combination contained in complainant's burner, and operated in substantially the same way and with the same practical result, defendants are entitled to a verdict, and it is immaterial that in the Barker burner the slit can be opened and closed and cannot be in the other.

Fifth. That the difference in the fineness or coarseness of the slit in the tips of the burner-stems of the complainant's burner and the Horace R. Barker burner is immaterial.

Sixth. That the shape of the perforations in the burners' stems is immaterial, so also is their location, so long as they are so shaped and located as to admit of gas passing from the inside of the burner-stem to the annular space between the burner-stem and the surrounding-tube.

The court remarked that the mere fact of the shape of the perforations in the burner, whether the perforation was a slit or a series of holes, was not material; that the form of the perforations was not

essential; that in regard to the other requests he had endeavored to place the questions therein involved in such a manner as to be easily understood by the jury, and that what had been said was to be their guide; that in the hasty reading of those requests nothing struck his ear which was objectionable.

The jury, having retired, returned into court and rendered the following verdict:

In answer to the first question, "Whether or not the complainant is the first and original inventor of the improvement for which the above-named patent is granted to him?" we find that he is.

In answer to the second question, "Whether or not the gas-burners manufactured by the defendants are substantially identical with
141 those described in the complainant's patent and schedule thereunto annexed, in their construction and mode of operation?" we find that they are.

And inasmuch as the matters aforesaid do not appear upon the record, the defendants' counsel has caused this case to be made, with leave to proceed thereon in any proper manner before the circuit court sitting as a court of chancery.

In witness whereof I have hereunto set my hand and seal this 16th day of June, 1874.

N. SHIPMAN, [L. S.]
Judge.

The United States Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office of the file-wrapper in the matter of the letters patent granted Theodore Clough, dated June 14th, 1870, No. 104271, for "Air-gas burners."

In testimony whereof I, J. M. Thatcher, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this first day of June, in the year of our Lord one thousand eight hundred and seventy-four, and of the Independence of the United States the ninety-eighth.

[L. S.] J. M. THATCHER.

142 96.
21. No. 104271.

Theodore Clough, of Dobbs Ferry, county of Westchester, State of New York.

AIR-GAS BURNERS.

Rec'd, Dec. 4, 1869.
Petition, Dec. 4, 1869.
Affidavit, Dec. 4, 1869.
Specification, Dec. 4, 1869.
2 drawings, Dec. 4, 1869.
Model, Dec. 4, 1869.
Cert. dep.
1 cash $15, Dec. 4, 1869.
Add'l fee cert.
1 add'l fee, cash $20, June 3, 1870.
Examined Deane, Dec. 10, 1869.

2 issue, Grinnell, Dec. 11, 1869.
3 patented, June 14, 1870.
Recorded, vol., page .
Circular, Dec. 14, 1869.

Commissioner's patent.

No. 104271.

The United States of America to all to whom these presents shall come:

Whereas Theodore Clough, of Dobbs Ferry, New York, has alleged that he has invented a new and useful improvement in gas-burners, and has made oath that he is a citizen of the United States; that he verily believes he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioners of Patents praying that a patent may be issued therefor:

143 These are, therefore, to grant to the said Theodore Clough, his executors, administrators, or assigns, for the term of seventeen years from the fourteenth day of June, one thousand eight hundred and seventy, the full and exclusive right and liberty of making, using, and vending to others to be used, the said improvement, a description whereof is given in the annexed schedule, and made a part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office to be hereunto affixed.

Given under my hand at the city of *of* Washington this fourteenth day of June, in the year of our Lord one thousand eight hundred and seventy, and of the Independence of the United States of America the ninety-fourth.

[L. S.]

W. T. OTTO,
Acting Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

SAM'L S. FISHER,
Commissioner of Patents.

144 UNITED STATES PATENT OFFICE.

Theodore Clough, of Dobbs Ferry, New York.—Letters patent No. 104271, dated June 14, 1870.—Improvement in gas-burners.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Theodore Clough, of Dobbs Ferry, in county of Westchester and State of New York, have invented certain new and useful improvements in air-gas burners; and I do hereby declare that the following is a full and correct description thereof, reference being had to the accompanying drawings, and to the letters of reference thereon.

My invention relates more particularly to the burners for burning illuminating gas made by saturating air with vapors of gasoline, commonly called air-gas. It has been found that common bat-wing or fish-

tail burners are not adapted to burning this gas as ordinarily made, owing to the variable density of the gas coming from the generating apparatus.

The object of my improvement is to adapt the slitted or bat-wing burner to the burning of air-gas.

Said improvements consist—

145 First. In perforating the base of the burner-tube with small holes or passages for gas to escape at the base of the burner, and surrounding the burner with a tube, open at the top, but closed at the bottom, and united to the burner below the perforations in the burner-tube. It is more convenient to screw the tube to the burner, but it may be attached in any suitable manner.

Second. In regulating the escape of gas from the perforations at the base of the burner by a sliding tubular valve or cut-off introduced into the burner-tube of the base and extending upward within it, the position of the tubular valve being regulated by a screw.

These improvements, by furnishing a regulated supply of gas outside the burner, but directed to the tip of the burner by the surrounding-tube, give steadiness and increased illuminating power to the flame of the bat-wing burner, and make it a desirable burner for burning air-gas.

The drawings represent a bat-wing burner as improved by me.

Figure 1 represents an elevation of my improved burner, attached to a short piece of gas-pipe.

Figure 2, a view showing the surrounding-tube in section, and the burner therein.

Figure 3, a vertical section through the burner and tube.

Figure 4, a transverse section through the base of the burner-tube.

Letter *a* represents the burner-tip.

b, the burner-tube.

(Here follows diagram marked page 146.)

146½ *c*, perforations at the base of burner-tube.

d, the surrounding-tube screwed to base of burner-tube.

e, the tubular valve extending up in the burner-tube, and operated by an annular screw, *f*, attached to the lower end. Said annular screw, beside having a screw to work in the base of the burner, has an internal screw, by which it and the burner is attached to the gas-pipe, as clearly shown in Fig. 3 and 4 and the other drawings, the gas-way being through the annular screw and tubular valve to the burner.

As the burner is connected to the gas-pipe *g* by means of the annular screw, the adjustment of the gas escaping through the perforations of the burner screw,

I claim as my invention and improvement in air-gas burners—

The bat-wing burner, perforated at the base, in combination with the surrounding-tube, substantially as described.

Also, in combination with the bat-wing burner, perforated at the base, and surrounding-tube, the tubular valve for regulating the supply of external gas to the burner, substantially as described.

THEODORE CLOUGH.

Witnesses:

F. C. TREADWELL, JR.

JOSEPH CAMPBELL.

The U. S. Patent Office to all persons to whom these presents shall come, greeting:

This is to certify that the annexed is a true copy from the files of this office of the specification, petition, oath, and drawing in the
147 matter of the rejected application of Horace R. Barker, filed February 25th, 1869, for "improvements in gas-burners."

In testimony whereof I, Sam'l A. Duncan, Acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this third day of July, in the year of our Lord one thousand eight hundred and seventy-one, and of the Independence of the United States the ninety fifth.

SAM'L A. DUNCAN,
Acting Commissioner.

To the Hon. Commissioner of Patents:

The petition of Horace R. Barker, of Lowell, in the county of Middlesex and State of Massachusetts, respectfully represents that your petitioner has invented certain new and useful improvements in gas-burners, which he verily believes has not been known or used prior to the invention thereof by your petitioner; he therefore prays that letters patent of the United States may be granted to him therefor, vesting in him and his legal representatives the exclusive right to the same, upon the terms and conditions expressed in the act of Congress in that case made and provided, he having paid fifteen dollars into the Treasury, and complied with the other provisions of the said act.

HORACE R. BARKER.

CITY OF LOWELL, COUNTY OF MIDDLESEX,
And State of Massachusetts, ss:

On this (20) twentieth day of February, A. D. 1869, before me, the subscriber, a justice of the peace in and for said county and State, personally appeared the within-named Horace R. Barker, and made solemn oath that he verily believes himself to be the original and first inventor of the herein-described improvements in gas-burners, and that he does not know or believe the same was ever before known or used, and that he is a citizen of the United States.

JOHN E. CRANE,
Justice of the Peace.

148 To all whom it may concern:

Be it known that I, Horace R. Barker, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful improvements in gas-burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings making part of this specification, in which—

Fig. 1 represents a central sectional elevation.

Fig. 2 a side view, and both as applied to an ordinary gas-fitting.

Fig. 3 is a side elevation of one of the slotted burner-tubes, detached, and

Fig. 4, a top view of the same.

Fig. 5 is a modification of my invention, partly in section.

This invention relates to that kind of gas-burners which are slotted, and which allow the gas to flow through the slot and burn in a thin sheet of flame, and are called "bat-wing or fish-tail burners," and this invention has for its object to control and regulate the flow of gas at

the burner, instead of the "cock or the generator," thereby reducing or increasing the size of the flame without reducing the pressure of the gas.

This invention consists in the peculiar construction of the burner-tube A, the slot C of which extends to near the base of the tube, which is provided with a conical projection, *d*, near the top, and a screw-threader base, *b*, and a flange, F, at the bottom, and is covered and operated to close or contract the slot by a regulating barrel, B, the
149 lower end of which screws on to the base *b* of the tube, and the upper end acts upon the conical projection to draw the divided parts of the tube together or allow them to spring outward, thereby increasing or reducing the size of the slot, and controlling or regulating the flow of gas at the burner, and consequently the size of the flame.

In the ordinary slotted gas-burner the slot is a fixture, and cannot be varied except by positive enlargement, and it cannot be reduced, consequently the flow of gas and the size of the flame must be regulated by turning the cock; by this means, and with some kind of gas, particularly that made from "naphtha, gasoline," and other volatile oils or fluids, the flame cannot be regulated, and it becomes necessary to dilute the gas, so rich with carbon, by admitting or by forcing air into the apparatus between the vaporizing or gas-generating machine and the burners.

This diluting operation is attended with difficulties and expenses, requiring considerable extra pipe and a device for injecting air; and also the services of (at least) one person to keep the gas diluted in a proper degree to burn with little smoke, and to keep up a suitable and relative pressure to make the gas burn steadily. In burning this naphtha-gas (so called), the cock C can only be used with success for letting on or shutting off the gas from the burner, and any attempt to regulate the flame by turning the cock will so reduce the pressure as to make the flame dim and unsteady.

My invention and improvement provides a ready remedy for all such difficulties, whether used for naphtha-gas or for coal-gas, or for any other kind of gas used for illuminating purposes; and when the gas is too rich with carbon, or for any other cause, the flame becomes enlarged beyond the desired degree, turning or screwing the barrel B downward brings the annular lip *e* into contact with and
150 unto the upper slope or angle of the conical projection *d* of the tube *a*, and draws the two parts or sides of the tube nearer together, thus contracting the slot *c* and reducing the size of the flame without reducing the pressure of the gas, which will continue to burn with force and energy, producing a good, clear light.

The size of the slot should be regulated for burning different kinds naptha of gas; the slotted and regulating burners used for burning gas requires to be more open than for burning coal-gas, and for burning the former gas, I generally make the top of the slot or opening about as shown in Figures 1 and 2, where the two sides of the tube "*a*" are drawn together.

If for burning coal-gas, the slot when open should be about as shown in Figure "3" and such slot may be fully closed, or the sides of the tube brought so near together as to contract the slot and the flame to any desired dimensions, the tube "*a*" may be slotted both ways, or one slot across the other, both slots terminating at the centre, as shown in Fig. "4," and such a slotted burner, when used in connection with an adjusting and regulating barrel "B," produces a cross-flame, or a flame representing a cross in its horizontal section or top view, as shown

in Fig. "4," and such a flame will give a great amount of light, and has a very pleasing appearance, and such a cross flame may be regulated by operating the adjusting barrel "B," as before described.

In a gas-burner, made adjustable, as shown and described, there will be no liability of the slot getting choked with substances passing through the pipes, and no substance can lodge in a slot so frequently opened and closed, or partially closed, to regulate the flow of gas; whereas, in the use of the ordinary slotted burner, which has a fixed slot, it is frequently necessary to saw out the slots to clear the burners of substances lodged within.

151 The handle "D," projecting from the side of the barrel "B," is for turning the latter when too much heated for safe contact with the hand.

I am aware that a screw threader nut has been arranged on the outside of an inner and concealed slotted tube, so as to be raised or lowered to cover or uncover the sides of the fixed slot, and thereby regulate the flow of gas to the burner, which covers and conceals the slotted tube and the nut; such a device cannot be used for burning naphtha-gas, nor with any considerable degree of success for burning other illuminating gas; for any device arranged within the burner to regulate the flow of gas reduces the pressure, and produces the same effect that is produced by partially closing the cock, viz., to reduce the force and energy of the flame, and render it weak and dim.

I disclaim having invented the equivalent, in principle, operation, or effect, the above described device.

Instead of the screw-thread on the base "*b*," or the lower part of the tube "*a*," or in addition thereto, I sometimes cut the screw-thread on the slope or angle of the conical projection "*d*," and a corresponding screw-thread in the upper part of the barrel "B," which is clearly shown in Fig. "5"; in this case I generally slide the lower part of the barrel on to the base of the tube, with a close-fitting joint, so there can be no leak of gas between the two parts thus fitted together. In a burner thus made, the sides of the split tube are drawn together or released and allowed to spring outward to vary the size of the slot or opening; by turning the barrel to raise or lower it on the tapering screw cut in the cone "*d*" raising the barrel allows the slot to open, and screwing the barrel downward, draws the parts of the tube together and reduces or closes the slot or slots. What I claim as my invention is—

First. The burner tube "A," constructed and slotted as shown and described, whereby the barrel "B" may be applied and operated to close or open the slot or slots in the manner and for the purpose specified.

(Here follows diagram marked page 152.)

153 Second. And in combination with the burner tube "A," constructed and slotted as shown and described, the adjustable regulating barrel "B" when constructed, applied and arranged, to operate as and for the purpose set forth.

HORACE R. BARKER.

Witnesses:

A. W. SHERMAN,

JOHN E. CRANE.

No. 105768.

The United States of America to all to whom these letters patent shall come:

Whereas John F. Barker, of Springfield, Massachusetts, has alleged that he has invented a new and useful improvement in gas-burners, and has made oath that he is a citizen of the United States, that he verily believes he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to his knowledge and belief, been previously known or used, has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of Patents, praying that a patent may be issued therefor:

These are therefore to grant to the said John F. Barker, his executors, administrators or assigns, for the term of seventeen years from the twenty-sixth day of July, one thousand eight hundred and seventy, the full and exclusive right and liberty of making, using and
154 vending to others to be used, the said improvement, a description whereof is given in the annexed schedule, and made a part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office to be hereunto affixed.

Given under my hand at the city of Washington, this twenty-sixth day of July, in the year of our Lord one thousand eight hundred and seventy, and of the Independence of the United States of America, the ninety-fifth.

W. F. OTTO,
Acting Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.
[SEAL.] SAM'L T. FISHER,
Commissioner of Patents.

UNITED STATES PATENT OFFICE.

John F. Barker, of Springfield, Massachusetts. Letters patent, No. 105768, dated July 26, 1870. Improvement in gas-burners.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

155 Be it known, that I, John F. Barker, of Springfield, in the county of Hampden and State of Massachusetts, have invented a new improvement in gas-burners; and I do hereby declare the following, when taken in connection with the accompanying drawing and letters of reference marked thereon, to be a full, clear, and exact description, and which said drawing constitutes part of this specification, and represents in

Figure 1 a side view of one modification of my invention.

Figure 2 is a side view of the shell.

Figure 3 is a side view of the burner.

Figure 4 is a vertical longitudinal section of the shell, through line A B of Fig. 2.

Figure 5 is a vertical longitudinal section of the burner, through line C D of Fig. 3.

Figure 6 is a side view of another modification of my invention.

Figure 7 is a side view of the shell.

Figure 8 is a side view of the burner.

Figure 9 is a vertical longitudinal section of the shell, through line E F of Fig. 7, and

Figure 10 is a vertical section, through line G H of Fig. 8.

My invention relates to a device for regulating the flow of carbureted air or gas from the burner to its point of combustion; and

It consists of a burner having a screw-thread made upon its lower part, upon which is fitted, to turn freely thereon, a shell or tube, also having a screw-thread upon its interior lower part; and the bore of said tube or shell is somewhat larger in diameter than the diameter of the upper part of the burner upon which it turns.

156 A series of perforations is made in the lower part of the burner, so that when the burner is made or set for the combustion of carbureted air or gas of any certain quality, the flame may be increased or diminished by turning the shell either up or down, as the case may be, the shell, in its movements up or down, either closing or opening the holes or perforations, and letting out or stopping the flow of the gas through the said holes, as it is moved up or down.

In the use of carbureted air for illuminating purposes, it is almost always the case that, when the gasoline is first placed within the generator, it gives off a much greater amount of vapor, and the air, in passing through the generator, absorbs a greater amount of the carbon, and consequently becomes more thoroughly charged with, and is much richer in, the illuminating qualities of the gasoline than when the generator has been charged for a greater length of time; and, as a result the carbureted air is sometimes too rich to make a desirable light, with the same amount passing out the burner, and at other times, as when the generator has been charged a longer time, the carbureted air flowing through the burner is deficient in illuminating power, and the light or flame produced is not uniform in its power or steadiness, and is sometimes liable to produce a smell of smoke when too rich in carbon.

My invention is designed to obviate all difficulty in this respect, as the burner is set or made to let out, at the tip, the minimum quantity of gas that will produce a good flame, and as the gasoline remains longer in the generator and becomes weaker in its illuminating qualities, the outer tube or shell may be turned so as to let out more gas, and increase the flame without liability to smoke.

That others skilled in the art may be enabled to make and use my invention, I will now proceed to describe its construction and mode of operation.

157 In the drawing—

L represents the main part of the burner, which is made similar to the common burner, except that the lower part has a screw-thread made upon the outside and inside.

Figs. 1, 2, 3, 4, and 5 represent one modification, in which L is the burner, having the usual screw-thread made upon the lower interior part by which to secure it to the pipe.

At a^1 is a conical shoulder or seat upon the interior, shown in Figs. 3 and 5, and a screw-thread d made upon the exterior of the lower end, and the small holes e are made either at the seat a^1 or just below it.

I is a shell or tube, the inside diameter of its upper part being somewhat greater than the outside diameter of the part L, and upon the interior of the tube, at a, is a conical shaped seat made to fit upon the exterior seat a^1, upon the burner L.

A screw-thread *d* is made upon the interior of the lower part of the tube I, which fits the thread a^1 upon the exterior of the burner L.

The operation of this modification is as follows:

When the tube I is turned entirely on to the burner L, the inner seat *a* fits down upon the shoulder a^1 of the burner L, and the only place of egress for the gas is through the slot at the tip.

When the gasoline is fresh or new, this slot will be quite sufficient to supply the flame; but as the gasoline becomes more exhausted of carbon, the tube or shell I may be turned up a little, so that the seat *a* shall be raised slightly from the shoulder a^1, and more or less of the gas will pass out through the holes *c*, and pass up between the tube I and the burner L, as the tube I is turned up or down, and when the gas which escapes through the holes *c*, and passes up between the tube and the burner, reaches the top, it unites with that passing out the slot at the tip, increasing the volume and flame.

158 In this device, the gas, after passing out through the holes *c*, is prevented from passing down between the tube and burner by the screw-threads *d* and d^1 upon the inside of the tube and outside of the burner.

In the modification shown in Figs. 6, 7, 8, 9, and 10, both the burner and regulating-tube are similar to that already described, except that the thread d^1, upon the outside of the burner L, is carried up higher, and the holes *c* are made below the top of the outer thread, but above the top of the inside thread.

The thread upon the inside of the tube I is not so long as the outside thread upon the burner L, but is considerably less, so that when the tube I is turned entirely down on the burner, the holes will be above the thread on the inside of the tube; and there is no inside seat in the tube I to operate upon a beveled or conical exterior shoulder upon the burner L, as in the other modification.

The operation of this modification is as follows:

If the flame be too weak, the tube I is turned down upon the burner L until the top of the inside thread of the tube begins to pass below the holes *c*, when the gas will escape and pass up between the tube and burner, and increase the flame as before.

If it should be desirable to stop the escape of gas through the holes *c*, it is only necessary to turn up the tube upon the burner, and when the thread inside the tube covers the holes *c*, then there will be no escape of gas.

It will be seen that the principles of the operation of both modifications are very much alike, and are intended to accomplish the same object, although the tube turns up in the first case to let out more gas, while it turns down in the second case, both being equivalent, however, in their operation, and accomplish the same result.

I am aware that gas-burners have been heretofore made to give an additional supply of gas to the flame, but in those that I have
159 seen, they consisted of more pieces, and were considerably more expensive to manufacture, and in their operation the burner revolved with the tube, thus causing the flame to revolve also. This is very objectionable, as it is often desirable to have the flame stand in one particular direction.

In this device the flame does not turn in the least, while the whole burner may consist of only two pieces, and is cheaply made, and its operation and effect are perfect.

Having thus described my invention, what I claim as new, and de-

sire to secure by letters patent is, an improved gas-burner, consisting of the burner or pillar L, having holes *c c* therein, and provided with the movable or adjustable shell or tube I, all constructed and operating substantially as and for the purposes herein described and specified.

JOHN F. BARKER.

Witnesses—
F. A. CURTIS,
M. L. BOYNTON.

(Here follow 4 diagrams marked pages 160, 161, 162 & 163.)

163½ United States circuit court, southern district of New York, second circuit.

THE GILBERT & BARKER MANUFACTURING Company. *vs.* THEODORE CLOUGH.

NEW YORK, *December 21st.*, 1874.

You will please to take notice that the testimony herein will be taken orally under the provisions of the 67th rule of practice for the courts of equity of the United States, and that the examination of complain-
164 ant's witnesses will be commenced on Monday, December 28th, 1874, at three o'clock in the afternoon of that day, at the United States circuit court clerk's office, at No. 41 Chambers street, in the city of New York, before Mr. Commissioner Stilwell.

STANLEY, BROWN & CLARKE,
Compl't's Sol'rs.

TO YEAMAN & WEBSTER,
Defendant's Sol'rs.

CITY AND COUNTY OF NEW YORK, *ss:*

Leonard E. Curtis, being duly sworn, says that he this day personally served the within notice upon Geo. H. Yeaman, solicitor for the defendant herein, by leaving a true copy thereof at his office at No 294 Broadway, New York, with his clerk.

LEONARD E. CURTIS.

Sworn to before me, this 21st day of December, 1874.

MELVIN BROWN,
Notary Public, N. Y. City and Co.

Circuit court of the United States for the southern district of New York.

THE GILBERT & BARKER MANUFACTURING Company *vs.* THEODORE CLOUGH. } In equity.

165 Testimony taken before R. E. Stillwell, examiner, &c., for final hearing on the part of the complainants, under the 67th rule of the Supreme Court of the United States, as amended.

MONDAY, *December 28th*, 1874.

Present, William Stanley, esq., counsel for complainant; George H. Yeaman, esq., counsel for defendant.

Counsel for complainant offers in evidence patent of John F. Barker, dated 26th July, 1870, and marked "Exhibit Barker Patent, R. E. S., examiner, &c.," and of which the following is a copy:

EXHIBIT BARKER PATENT.—R. E. S., *examiner*, &c.

No. 105768.

"The United States of America to all to whom these letters patent shall come:

"Whereas John F. Barker, of Springfield, Massachusetts, has alleged that he has invented a new and useful improvement in gas-burners, and has made oath that he is a citizen of the United States; that he verily believes he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of Patents, praying that a patent may be
166 issued therefor.

"These are, therefore, to grant to the said John F. Barker, his executors, administrators, or assigns, for the term of seventeen years from the twenty-sixth day of July, one thousand eight hundred and seventy, the full and exclusive right and liberty of making, using, and vending to others to be used, the said improvement, a description whereof is given in the annexed schedule, and made a part of these presents.

"In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office to be hereunto affixed.

"Given under my hand at the city of Washington this twenty-sixth day of July, in the year of our Lord one thousand eight hundred and seventy, and of the Independence of the United States of America the ninety-fifth.

"W. F. OTTO,
"*Acting Secretary of the Interior.*

"Countersigned and sealed with the seal of the Patent Office.
[SEAL.] "SAM'L T. FISHER,
"*Commissioner of Patents.*

167 UNITED STATES PATENT OFFICE.

"John F. Barker, of Springfield, Massachusetts. Letters patent No. 105768, dated July 26, 1870. Improvement in gas-burners.

"The schedule referred to in these letters patent and making part of the same.

"To all whom it may concern:

"Be it known that I, John F. Barker, of Springfield, in the county of Hampden and State of Massachusetts, have invented a new improvement in gas-burners; and I do hereby declare the following, when taken in connection with the accompanying drawing and letters of reference marked thereon, to be a full, clear, and exact description, and

which said drawing constitutes part of this specification, and represents in—

"Figure 1 a side view of one modification of my invention.

"Figure 2 is a side view of the shell.

"Figure 3 is a side view of the burner.

"Figure 4 is a vertical longitudinal section of the shell through line A B of Fig. 2.

"Figure 5 is a vertical longitudinal section of the burner through line C D of Fig. 3.

168 "Figure 6 is a side view of another modification of my invention.

"Figure 7 is a side view of the shell.

"Figure 8 is a side view of the burner.

"Figure 9 is a vertical longitudinal section of the shell through line E F of Fig. 7, and

"Figure 10 is a vertical section through line G H of Fig. 8.

"My invention relates to a device for regulating the flow of carburetted air or gas from the burner to its point of combustion; and

"It consists of a burner having a screw-thread made upon its lower part, upon which is fitted, to turn freely thereon, a shell or tube, also having a screw-thread upon its interior lower part; and the bore of said tube or shell is somewhat larger in diameter than the diameter of the upper part of the burner upon which it turns.

"A series of perforations is made in the lower part of the burner, so that when the burner is made or set for the combustion of carbureted air or gas of any certain quality, the flame may be increased or diminished by turning the shell either up or down, as the case may be, the shell, in its movements up or down, either closing or opening the holes or perforations, and letting out or stopping the flow of the gas through the said holes, as it is moved up or down.

"In the use of carbureted air for illuminating purposes, it is almost always the case that, when the gasoline is first placed within the generator, it gives off a much greater amount of vapor, and the air, in passing through the generator, absorbs a greater amount of the carbon, and consequently becomes more thoroughly charged with, and is

169 much richer in, the illuminating qualities of the gasoline than when the generator has been charged for a greater length of time; and, as a result, the carbureted air is sometimes too rich to make a desirable light, with the same amount passing out of the burner, and at other times, as when the generator has been charged a longer time, the carbureted air flowing through the burner is deficient in illuminating power, and the light or flame produced is not uniform in its power or steadiness, and is sometimes liable to produce a smell of smoke when too rich in carbon.

"My invention is designed to obviate alldifficulty in this respect, as the burner is set or made to let out at the tip the minimum quantity of gas that will produce a good flame, and as the gasoline remains longer in the generator and becomes weaker in its illuminating qualities, the outer tube or shell may be turned so as to let out more gas and increase the flame, without liability to smoke.

"That others skilled in the art may be enabled to make and use my invention, I will now proceed to describe its construction and mode of operation.

"In the drawing—

"L represents the main part of the burner, which is made similar to

the common burner, except that the lower part has a screw-thread made upon the outside and inside."

"Figs. 1, 2, 3, 4, and 5 represent one modification, in which L is the burner, having the usual screw-thread made upon the lower interior part, by which to secure it to the pipe.

"At a^1 is a conical shoulder or seat upon the interior, shown in Figs. 3 and 5, and a screw-thread d made upon the exterior of the lower end, and the small holes c are made either at the seat a^1, or just below it.

"I is a shell or tube, the inside diameter of its upper part being somewhat greater than the outside diameter of the part L, and
170 upon the interior of the tube, at a, is a conical-shaped seat, made to fit upon the exterior seat a^1, upon the burner L.

"A screw-thread d is made upon the interior of the lower part of the tube I, which fits the thread a^1 upon the exterior of the burner L.

The operation of this modification is as follows:

"When the tube I is turned entirely on to the burner L, the inner seat a fits down upon the shoulder a^1 of the burner L, and the only place of egress for the gas is through the slot at the tip.

"When the gasoline is fresh or new, this slot will be quite sufficient to supply the flame; but as the gasoline becomes more exhausted of carbon, the tube or shell I may be turned up a little, so that the seat a shall be raised slightly from the shoulder a^1, and more or less of the gas will pass out through the holes c, and pass up between the tube I and the burner L, as the tube I is turned up or down, and when the gas which escapes through the holes c, and passes up between the tube and burner reaches the top, it unites with that passing out the slot at the tip, increasing the volume and flame.

"In this device the gas, after passing out through the holes c, is prevented from passing down between the tube and burner by the screw-threads d and d^1, upon the inside of the tube and outside of the burner.

"In the modification shown in Figs. 6, 7, 8, 9, and 10, both the burner and regulating tube are similar to that already described, except that the thread d^1, upon the outside of the burner L, is carried up higher, and the holes c are made below the top of the outer thread, but above the top of the inside thread.

"The thread upon the inside of the tube I is not so long as the outside thread upon the burner L, but is considerably less, so that when the tube I is turned entirely down on the burner, the holes
171 will be above the thread on the inside of the tube; and there is no inside seat in the tube I to operate upon a beveled or conical exterior shoulder upon the burner L, as in the other modification.

"The operation of this modification is as follows:

"If the flame be too weak, the tube I is turned down upon the burner L until the top of the inside thread of the tube begins to pass below the holes c, when the gas will escape and pass up between the tube and burner, and increase the flame as before.

"If it should be desirable to stop the escape of gas through the holes c, it is only necessary to turn up the tube upon the burner, and when the thread inside the tube covers the holes c, then there will be no escape of gas.

"It will be seen that the principles of the operation of both modifications are very much alike, and are intended to accomplish the same object, although the tube turns up in the first case to let out more gas, while it turns down in the second case, both being equivalent, however, in their operation, and accomplish the same result.

"I am aware that gas-burners have been heretofore made to give an additional supply of gas to the flame, but in those that I have seen, they consisted of more pieces, and were considerably more expensive to manufacture, and in their operation the burner revolved with the tube, thus causing the flame to revolve also. This is very objectionable, as it is often desirable to have the flame stand in one particular direction.

"In this device the flame does not turn in the least, while the whole burner may consist of only two pieces, and is cheaply made, and its operation and effect are perfect.

"Having thus described my invention, what I claim as new,
172 and desire to secure by letters patent is, an improved gas-burner, consisting of the burner or pillar L, having holes *c c* therein, and provided with the movable or adjustable shell or tube I, all constructed and operating substantially as and for the purposes herein described and specified.

"JOHN F. BARKER.

"Witnesses:
F. A. CURTIS.
M. L. BOYNTON."

(Here follows diagram marked page 173.)

174 The defendant admits, at request of complainants' counsel, that the patent in evidence was duly assigned to the complainants on or about the 29th day of May, 1870, and that the complainants are a corporation, duly incorporated under the laws of the State of Massachusetts, prior to the date above mentioned.

The consent is given, subject to the right of defendant's counsel to withdraw the same at any time before final hearing, upon giving complainants' solicitors two days' notice, in writing, of his intention so to do.

Adjourned to the 12th of January, at 3 p. m.

Complainants rest.

January 12th, adjourned by consent to January 16th.

U. S. circuit court.

THE GILBERT & BAKER MANUFACTURING Company
ag'st
THEODORE CLOUGH.

JANUARY 16, 1875.

Before Commissioner Stilwell.

Mr. Yeaman, for defendant; Mr. Stanley, for complainant.

THEODORE CLOUGH, having been duly sworn, testified as follows, being called in his own behalf:

175 I am the defendant in this suit and the patentee named in letters patent 104271, issued on the 14th day of June, 1870, a copy of which is now offered in evidence and marked Defendants' Exhibit, Clough Patent, and of which the following is a copy:

"No. 104271.

"The United States of America to all to whom these presents shall come:

"Whereas Theodore Clough, of Dobbs' Ferry, New York, has alleged that he has invented a new and useful improvement in gas-burners, and has made oath that he is a citizen of the United States; that he verily believes he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioners of Patents praying that a patent may be issued therefor.

"These are, therefore, to grant to the said Theodore Clough, his executors, administrators, or assigns, for the term of seventeen years from the fourteenth day of June, one thousand eight hundred and seventy, the full*y* and exclusive right and liberty of making, using, and vending to others to be used, the said improvement, a description whereof is given in the annexed schedule, and made a part of these presents.

"In testimony whereof I have caused these letters to be made patent, and the seal of the Patent Office to be hereunto affixed.

"Given under my hand, at the city of Washington, this fourteenth day of June, in the year of our Lord one thousand eight hundred and
176 seventy, and of the Independence of the United States of America the ninety-fourth.

[L. S.]

W. T. OTTO,
"*Acting Secretary of the Interior.*

"Countersigned and sealed with the seal of the Patent Office.

"SAM'L S. FISHER,
"*Commissioner of Patents.*"

"UNITED STATES PATENT OFFICE.

"Theodore Clough, of Dobbs' Ferry, New York. Letters patent No. 104271, dated June 14, 1870. Improvement in gas-burners.

"The schedule referred to in these letters patent and making part of the same.

"To all whom it may concern:

"Be it known that I, Theodore Clough, of Dobbs' Ferry, in county of Westchester, and State of New York, have invented certain new and useful improvements in air gas-burners, and I do hereby declare that the following is a full and correct description thereof, reference being had to the accompanying drawings, and to the letters of reference thereon.

"My invention relates more particularly to the burners for burning illuminating gas made by saturating air with vapor of gasoline, commonly called air-gas. It has been found that common bat-wing
177 or fish-tail burners are not adapted to burning this gas as ordinarily made, owing to the variable density of the gas coming from the generating apparatus.

"The object of my improvement is to adapt the slitted, or bat-wing, burner to the burning of air-gas.

"Said improvements consist:

"First. In perforating the base of the burner-tube with small holes or passages for gas to escape at the base of the burner, and surrounding the burner with a tube, open at the top, but closed at the bottom, and united to the burner below the perforations in the burner-tube. It is more convenient to screw the tube to the burner, but it may be attached in any suitable manner.

"Second. In regulating the escape of gas from the perforations at the base of the burner, by a sliding tubular valve or cut-off, introduced into the burner-tube of the base and extending upward within it, the position of the tubular valve being regulated by a screw.

"These improvements, by furnishing a regulated supply of gas outside the burner, but directed to the tip of the burner by the surrounding-tube, give steadiness and increased illuminating power to the flame of the bat-wing burner, and make it a desirable burner for burning air-gas.

"The drawings represent a bat-wing burner as improved by me.

"Figure 1 represents an elevation of my improved burner, attached to a short piece of gas-pipe.

"Figure 2, a view showing the surrounding-tube in section, and the burner therein.

"Figure 3, a vertical section through the burner and tube.

178 "Figure 4, a transverse section through the base of the burner-tube.

"Letter *a* represents the burner-tip.

"*b*, the burner-tube.

"*c*, perforations at base of burner-tube.

"*d*, the surrounding-tube screwed to base of burner-tube.

"*e* the tubular valve extending up in the burner-tube, and operated by an annular screw, *f*, attached to the lower end. Said annular screw, beside having a screw to work in the base of the burner, has an internal screw, by which it and the burner is attached to the gas-pipe, as clearly shown in Fig. 3 and 4 and the other drawings, the gas-way being through the annular screw and tubular valve to the burner.

"As the burner is connected to the gas-pipe *g* by means of the annular screw, the adjustment of the gas escaping through the perforations of the burner-screw.

"I claim as my invention and improvement in air-gas burners:

"The bat-wing burner, perforated at the base, in combination with the surrounding-tube, substantially as described.

"Also, in combination with the bat-wing burner, perforated at the base, and surrounding-tube, the tubular valve for regulating the supply of external gas to the burner, substantially as described.

"THEODORE CLOUGH.

"Witnesses:

"F. C. TREADWELL, JR.,

"JOSEPH CAMPBELL."

179 (The drawings of this patent may be seen in the printed case of Theodore Clough vs. The Gilbert & Barker Mfg. Co., at page 113.)

I am the true and original inventor of the gas-burners described in

Exhibit Clough Patent; my business is the manufacture of gas-burners; I have been in that business since 1870; before that time I had a great deal of experience in burners for lamps—I mean in burners for gas-lamps; I commenced experimentally on this particular burner, which I patented in 1870—in 1869; I think somewhere about February; after I had filed my application for a patent I saw a man I supposed was Mr. Gilbert, of the Gilbert & Barker Manufacturing Co.; I have since seen Mr. Charles N. Gilbert and think he was the man; I saw him in court with Mr. George H. Kitchen; Mr. Gilbert was at that time in business with the Gilbert & Barker Manufacturing Co.; my object was to make them agents for my burner, to see if I could make a business out of it; I showed and left with him a specimen of my burner; I think the application had been then filed about two months; I have since seen and read their patent issued to John F. Barker, which is in evidence.

Q. State whether or not that patent describes and claims substantially the same invention and improvements described in your patent.

(Objected to as incompetent, as a comparison of the patents would be the best evidence.)

A. It does.

Q. You have seen and examined the gas-burners made by complainants, and purporting to be made under the John F. Barker patent?

(Objected as irrelevant and immaterial.)

A. I have.

180 Q. State whether these burners are materially different or practically the same as the burners claimed and described in your patent, and which you made under your patent.

(Objected to as incompetent and immaterial.)

A. Practically the same.

Q. State whether or not John F. Barker is the true and original inventor of the gas-burners described in his patent.

(Objected; that it does not appear that witness knows; and as matter of opinion incompetent.)

A. I should say that he was not the inventor.

Q. Who then was?

(Same objection.)

A. I should say Theodore Clough was the inventor of that burner.

Q. Had the Barker burner been made and used before Barker obtained his patent therefor; and, if so, when, where, and by whom?

A. It was used by George H. Kitchen, S. C. Nash, and Oakes Tirrill, and quite a number of others—John Wheelock—and was made by me; they were made at Dobbs Ferry, New York, in the spring of 1870. I am complainant in the suit in equity now pending in this court against the Gilbert & Barker Manufacturing Company, defendants in that suit, and complainants in this suit, in which suit first named I complain of an infringement by the said Gilbert & Barker Manufacturing Company of my said patent of the 14th June, 1870.

Q. Examine Exhibits A, B, and C, of complainant in the said suit of Clough against The Gilbert & Barker Manufacturing Company, and say who made them, and under what patent.

(Objected to as to the words "under what patent," as incompetent and immaterial.)

181 A. They were made by myself, under my patent of June 14th, 1870.

Q. Examine Complainant's Exhibit E in the same action, and say who made it?

A. The Gilbert & Barker Manufacturing Co.

Q. State whether that burner E, is substantially the same in its construction, mode of operation, and results produced as the burner claimed and described in your patent, or different therefrom?

(Objected to as incompetent and immaterial.)

A. I should say it is practically the same.

The defendant now offers in evidence all the pleadings and proceedings, testimony, and verdict of the jury as contained in the case and exceptions, signed and approved by the Hon. Nathaniel Shipman, acting as circuit judge, in the said case of Theodore Clough against the Gilbert & Barker Manufacturing Co., and now on file in said case.

(Objected to as incompetent and immaterial in this case.)

Defendant also offers in evidence the opinion of the said Judge Shipman, denying the motion made for a new trial on said case and exceptions, and the certificate of the said judge touching the said trial and proceedings before him, dated the 10th of September, 1874, said certificate and opinion being on file in said suit in this court.

(Objected to as incompetent and immaterial.)

They are marked Defendant's Exhibits Suit Clough, Comp.: Shipman's Opinion and Certificate.

Adjourned to the 18th inst., at 3 p. m.

Adjourned, by consent, to February 25th, at 12.30 p. m.

182 The following is a copy of—

Defendant's Exhibit Shipman's Opinion and Certificate.

THEODORE CLOUGH
vs.
THE GILBERT & BARKER MANUFACTURING COMPANY.

SHIPMAN, J.:

This suit was commenced by a bill in equity, which was brought to restrain the alleged infringement of a patent, dated June 10th, 1870, for an improvement in air-gas burners. The court, upon motion of both parties, ordered that a feigned issue be granted, and that the following questions be tried at law:

"First. Whether or not the complainant is the first and original inventor of the improvement in gas-burners for which the first above-named patent has been granted to him?

"Second. Whether or not the gas-burners manufactured by the defendants are substantially identical with that described in the complainant's patent and schedule thereto annexed, in their construction and mode of operation?"

The jury answered each question in the affirmative. The defendants thereupon filed a motion for a new trial, upon the ground that said verdict was against the weight of evidence which was given in said cause.

The alleged invention of the complainant related to an improvement in burners for burning air-gas.

183 Experience proves that the bat-wing burner, which was commonly in use for burning coal-gas, was ill adapted to air-gas, owing to its variable density. At the beginning of the evening the gas was highly charged with carbon, and the ordinary burner emitted too much gas, and thereby caused smoke; later in the evening the gas became thinner in density, and an insufficient quantity was emitted through the burner-tip. The object of the invention was to adapt the slitted or bat-wing burner so as to obviate this difficulty; it consisted

in perforating the ordinary burner with holes at or near the base, and surrounding the burner with a sleeve or tube, and in directing two currents of gas—one through a fine slot in the tip of the burner, and the other, when necessity required, through the holes at its base, into the external sleeve, and thence to the burner-tip. The principle of the invention consisted in passing a second current of gas through the perforations in the burner-tube into the surrounding-sleeve, so that when there was a necessity for a greater supply of gas than would pass through the slit of the burner a tubular jet could be projected through the sleeve upon the outside of the burner-tip, coming up between the burner and the tube. This tubular jet of gas would necessarily be burned under a lower pressure than the bat-wing jet, and would give volume to the flame. It is obvious that the flow of gas through the perforations in the burner into the surrounding-tube must be regulated by some means, so that when the gas was dense none should escape through the holes, and when the gas was thin the required additional quantity could be permitted to flow through the surrounding-sleeve.

The complainant produced three burners, each of which he claimed and embraced in his patent. One, marked C, contained within the sleeve a tubular valve surrounding the holes at the base of the burner; when the burner was screwed down upon the valve the holes were
184 shut, and the burner acted as a common bat-wing burner; as the burner was screwed up the valve was loosened and the holes were uncovered, and the flow of gas through the tube was increased. The two other burners, called A and B, did not have the tubular valve, but each was composed of two pieces, the outside tube and the burner perforated with holes. The outside tube was screwed upon the burner; when the tube was screwed down the holes were closed, and when it was screwed up the holes were opened; the valve was a part of the outside tube, and the supply of gas was increased or diminished by elevating or depressing the tube. The burners which were manufactured and sold by the defendants were substantially like A and B.

The first claim in the complainant's patent is for a bat-wing burner, perforated at the base, in combination with the surrounding-tube, substantially as described.

The second claim is as follows: "In combination with the bat-wing burner, perforated at the base, and surrounding-tube, the tubular valve for regulating the supply of external gas to the burner, substantially as described."

It is apparent that the first claim was not intended simply for a bat-wing burner, perforated at the base, in connection with a surrounding-tube, without reference to any regulating device for the transmission of the second current of gas through the tube, for the object of the improvement was to promote a regulated supply of gas outside the burner, and thus to overcome the difficulty arising from the variable density of the gas. This claim should be construed in connection with the explanation of the invention contained in the specification and drawings, which did not contemplate a mere perforated burner and surrounding-tube apart from means for regulating the flow of gas into the
185 surrounding-tube. Whether or not the specifications and drawings described A and B was the question which was made by the defendants, they did not deny upon the trial that A and B were embraced within the complainant's patent, provided A and B were so described in the specifications and drawings that a person skilled in the art could produce such burner without the aid of invention. The defendants insisted that A and B were not protected by the complainant's

patent, because such devices were not, as a matter of fact, sufficiently described therein, and that the only burner which was described was Exhibit C, which they claimed was substantially different from A and B.

Three propositions of fact were thus presented upon the trial of the case: 1st. That A and B were not embraced in the complainant's patent, because they were not sufficiently described in the specifications. 2d. That the defendant's burner was not substantially identical in its construction and mode of operation with complainant's burner C. 3d. That the complainant was not the first and original inventor of the improvement for which his patent was granted. Each of the witnesses upon both sides, with, perhaps, a single exception, was examined upon the first point. Upon the second question of fact testimony was also offered by both parties. The complainant contended that the location and also the form of the valve were alike unimportant, and that the valve in the surrounding-tube was a substitution for the tubular valve of an equivalent perfectly well known at the date of the complainant's patents, and was a mere formal alteration of the combination, suggested simply by mechanical skill.

I am of the opinion that the weight of evidence in this part of the case was not such as to justify me in granting a new trial. The most important question of fact in the cause was the one in regard to which the distinguished expert who was introduced by the defendant chiefly testified, viz: Whether the complainant was the original inventor of the burner for which his patent was granted.

186 The device mainly relied upon by the defendants upon the question of priority was a burner of Horace R. Barker, for which he made an unsuccessful application for a patent prior to the date of the plaintiff's invention. It consisted of a bat-wing burner slitted nearly to the base, and a surrounding-tube, smaller at the top than at the bottom. There was a screw upon the inside of the lower part of the tube. When the tube was screwed down upon the burner the top of the tube pressed against a conical and enlarged part of the burner near its top, and the slit was closed. When the tube was screwed up the slit was enlarged. The defendant claimed that the top of the tube, in connection with the protuberant part of the burner, formed a valve, and that the gas passed to the tip, not only through the burner, but through the ring near the tip at the end of the surrounding-tube in a double current, and that the device was substantially like the burner of the complainant. The complainant claimed that the object and the effect of this invention was to provide a burner in which the bat-wing slit could be enlarged or diminished at pleasure, and to consume but a single current of gas; that the top of the tube, in connection with the conical part of the burner, was not a valve, but a clamp, that when the burner was new or well made, this clamp prevented the escape of gas, and that there was no appreciable delivery of gas in a well-made burner except through the tip.

I am of opinion that the jury upon this question of fact did not misconceive the weight of evidence. When the verdict was rendered I thought that the jury had reached a proper conclusion upon the question of priority, and I am still satisfied with the result to which they came.

An apparent contradiction exists between the charge and the second supplementary request of the defendants, which was not in terms denied. I stated to the jury that I had already charged them upon the questions involved in the case, and that they were to be

187 guided by what had been said, but that, as the additional requests

were hastily read, nothing struck my ear which was objectionable. Counsel did not understand that when I had in writing submitted a question of fact to the exclusive determination of the jury I also intended, in response to a request made after the charge, to direct a verdict for the defendants.

The motion for a new trial is denied.

Circuit court of the United States for the southern district of New York.

At a stated term of said circuit court of the United States of America for the southern district of New York, held at the United States court-rooms, in the city of New York, on the 22d day of May, 1874.

Present, Nathaniel Shipman, district judge, holding said term.

THEODORE CLOUGH, COMPLAINANT,
against
JOHN F. BARKER, CHARLES N. GILBERT, AND The Gilbert & Barker Manufacturing Company. } In equity.

188 An order having been passed at a special term of said court, held at the United States court-rooms, in said city, on the 1st day of September, 1871, granting a feigned issue, and these the questions hereinafter recited be tried at law, as by said order on file will more fully appear, this is to certify that at the stated term of said court first above mentioned, and held for the trial by jury of issues at law, the issues framed in the above-entitled cause by virtue of said order came on for trial, and a jury having been duly impanelled and sworn, after hearing the evidence and the arguments of counsel who appeared for all the parties in said cause, and the charge of the court, and having had submitted to them written by the court, in conformity with the first and second issues, the jury retired for consultation and returned into court and rendered their verdict for the complainant upon both issues, that is to say, the jury answered the first question, viz: Whether or not the complainant is the first and original inventor of the improvement for which the above-named patent is granted to him?" in the affirmative, and also answered the second question, viz: "Whether or not the gas-burners manufactured by the defendant are substantially identical with those described in the complainant's patent and schedule thereunto annexed in their construction and mode of operation?" in the affirmative, and thereby they found that the complainant is the first and original inventor of the improvement in gas-burners for which his patent No. 104271 was granted to him on the fourteenth day of June, 1870, and that the gas-burners manufactured by the defendants are substantially the same with those described in complainant's patent and schedule thereunto annexed in their construction and mode of operation.

And I further certify that in my opinion the said verdict is sustained by the evidence which was given in said cause.

In witness whereof I have hereunto set my hand this 10th day of September, A. D. 1874.

N. SHIPMAN, *Judge.*

189 MONDAY, *January 18th*, 1875.

Present, counsel on both sides as before.

Cross-examined by Mr. STANLEY:

I reside in New York; place of business is 79 John street; I had been engaged in manufacturing gas-burners in an experimental way before 1869 in New York, in the New Haven depot; these burners were for burning gasoline gas; this was along about 1860; my business between 1860 and 1869 was manufacturing kerosene oil and naphtha, at Hunters' Point, L. I.; it was on my own account; I made the first completed burner like Exhibit C about June, 1869; Exhibit C, I believe, is the burner I made as experimental prior to the issue of the patent (Ex. Defendant Clough Patent); I can't say that I made any other that was fit to show; I made a number of other experiments, but they were too crude to show; after obtaining my patent, I first began to make burners, I think, December 3d, 1870; I then made burners like Exhibit A; that is the first date of sale; I must have made them in November, 1870, or perhaps earlier; I first made burners like Exhibit C for sale during the pending of my application for a patent; I should say I made five or six gross of them like Exhibit C; I didn't make any more like Exhibit C, because I had not sold what I had made; nobody worked with me at that time in the manufacture of these burners; I made this burner, Exhibit B, at Dobbs Ferry; I had a shop there with an experimental lathe; this shop was only for experiments; the shop belonged to my father-in-law, Mr. Christian Ramseyr; his business was cabinet making; I made Exhibit B about two months prior to the issuing of my patent; I fix the date because I moved from Dobbs Ferry to New York in April, and I remember showing the sample to the women folks,

190 who objected to it as being too small; I showed it to my wife and my father-in-law; I might have showed it to my mother-in-law; I don't remember any one else; Exhibit C is the style of burner I showed to Mr. Gilbert; Exhibit B has been laying in my drawer in my possession since its manufacture down to about the trial before Judge Shipman; I mean my shop drawer at 79 John street; it has never been used except by way of experiment; I sent a model to the Patent Office like Exhibit C and not like Exhibit B when I applied for my patent; a simple bat-wing burner was old in 1869; bat-wing burners with a surrounding-tube were also old at that time.

(Objected to.)

Yes, as seen in the Solliday, Coolidge, and Horace R. Barker burners; bat-wing burners with a slitted burner-stem and a surrounding-tube had been in use long before 1869; I had not heard of Mr. John F. Barker's burner before I made Exhibit B; the burners which I refer to in my direct testimony as having been used by George H. Kitchen, S. C. Nash, Oakes Tirrill, John Wheelock, and quite a number of others were burners like Ex. C, and not like the other exhibits; I first made burners like Ex. A a little prior to December, 1870; I was once put on the stand in an oil case as an expert in the manufacture of coal oil; that is the only case; my business was a machinist prior to being engaged in the oil trade; that was my trade; but I followed the brass business in making brass cocks.

Re-examined by Mr. YEAMAN, counsel for defendant:

The Horace R. Barker burner was entirely different from the John F. Barker burner; the Solliday and Coolidge burners were entirely different from my burners; in the Coolidge burner the surrounding-tube was used to open and close the slit; the Horace R. Barker burner was

practically the same as the Coolidge; the Solliday burner was simply a surrounding-tube to cut off the corners of the bat-wing flame so as to be suitable for globes; I should say I had taken out six or eight
191 patents for different inventions, not all for gas-burners, but for different objects; I have devoted a good deal of time and study to the subject of patents and inventions.

Q. As an expert, are you or are you not of the opinion that the same burners and the same questions as to other invention and the right to make them are involved in this suit as in the suit of yourself as complainant, against the Gilbert and Barker Manufacturing Company, defendant, now pending in this court?

(Objected to as incompetent and immaterial.)

A. I am of the opinion that it is the same.

Recross by Mr. STANLEY:

Q. It is your opinion that the question is the same when it is whether the Gilbert & Barker Co. infringe a patent of yours as when it is whether you infringe a patent of theirs?

(Objected to as calling for a legal conclusion, and not for a fact.)

A. I don't know; I think it is too much to expect from an expert to settle points of law.

THEODORE CLOUGH.

Subscribed and sworn to before me, this 18th January, 1875.

R. E. STILLWELL,
Examiner, &c.

Adjourned to the 27th instant, at 3 p. m.

It is agreed by the counsel that upon the trial of this cause either party may read such parts of the testimony as he wishes, given in the suit of Theodore Clough against the Gilbert & Barker Manufacturing Co., and contained in the printed case and exceptions in that suit, as evidence herein, subject to the same objections taken on the trial
192 at law in that suit; and that if the court will consent the two causes may be tried together, when the case of Clough against the said company or any motion for final decree therein is reached and heard.

This stipulation is without prejudice to the right of either party to take further testimony in this cause.

Defendant rests.

FEBRUARY 25TH, 1875.

Pursuant to adjournment. Present, counsel for the respective parties.

JOHN F. BARKER (sworn) called by Mr. STANLEY:

Q. Please state your name, age, residence, occupation, and what experience you have had in the mechanics, and in what branches of the mechanics you have been engaged.

A. John F. Barker; 35; Springfield, Massachusetts; treasurer of the Gilbert & Barker Manufacturing Company; my first experience in mechanics commenced in 1855, in the employ of H. R. Barker & Co., Lowell, Massachusetts, and I was there for four years engaged in introducing various kinds of fittings and fixtures commonly used for gas, steam, and water; from that time until the spring of 1862 I was employed in

the city of Philadelphia, in the introduction of gas-fixtures in gas, steam, and water works; in the spring of 1862 I was employed by the United States Government, in the national armory at Springfield, Massachusetts; I was for nearly four years in general charge there of all the work that related to steam, gas, and water; since early in 1866 I have been exclusively engaged in the manufacture, introduction, and sale of air-gas machines, and also all kinds of gas-fittings and fixtures appertaining to the business; in January of 1867 letters patent of the
193 United States were obtained by me for improved apparatus for carbureting air; also letters patent for the same purpose were obtained by me in July of 1867; still other letters patent, for the same purpose, were granted to me in April of 1868; on August 3d, 1869, two letters patent were granted to me; in 1870 I obtained letters patent for an improvement in gas-burners; about 1871 I obtained further letters patent for a device for producing a current of air for church organs; about 1872 I obtained another patent for apparatus for carbureting air, and in January of the present year I obtained further letters patent for improvements in low-pressure condensing steam-engines; since being engaged in the manufacture and sale of air-gas machines a large portion of my time has been devoted to the invention of improvements for carbureting air and in experiments in gas-burners for burning said carbureted air.

Q. Have you had the general charge of the mechanical department since you have been engaged in the gas-machine business?

A. I have exercised general superintendence over the entire mechanical work.

Q. What is air-gas or gasoline-gas for illuminating purposes, and how does it differ from coal-gas; and about what time did air-gas machines come into use?

A. Air-gas is a compound formed by the union of common air and of vapors of volatile hydro-carbon oils; this union is mechanical; coal-gas is what is known as carbureted hydrogen, the basis of which is hydrogen, and is produced by the destructive distillation of coal, it being of the same general character as gas that is produced from resin or oils by the same process, differing only in the relative proportions of hydrogen and carbon, which form the compound; gas that is made by destructive distillation is what is known as fixed gas, or, in other words, it is of a uniform standard quality, remaining practically the same
194 as it is made, and being but slightly susceptible to the influences of temperature; the union between the hydrogen and carbon of such gases is chemical, and therefore inseparable and non-condensible; as before stated, the union between common air and the vapor of hydro-carbon oils is mechanical, and the proportions of such union is a question of many circumstances; for instance, with a properly constructed apparatus, this union may be made by having the air and the vapor of the oils in the same proportions for even months at a time; this compound, however, is susceptible to changes in temperature, to some extent; extreme cold may precipitate a portion of the vapor from the air, or a higher temperature may cause a larger proportion of the vapor to mingle with the air; strictly speaking, air-gas is not a permanent fixed gas, the same as gas that is formed by destructive distillation, but is practically permanent under all ordinary conditions; it differs further from coal gas in the fact that, from time to time, its quality may vary to some extent, which might be caused by the difference in the quality of the oil or by its becoming greater in specific gravity as it is used.

Q. About when did the introduction of gasoline gas-machines com-

mence; what kinds of burners were then commonly used for such machines, and did they or not differ from coal-gas burners; what was that difference, if any; why did they differ?

A. Gas-machines were first introduced to a very limited extent in this country as early as 1853, using at that time benzole, of which there was but a limited supply; when petroleum was first discovered, about 1860, and its various products, which furnished an abundant supply of material for gas-machines, their introduction commenced on a much larger scale; at that time there were two classes of burners used, one being known as the Argand burner and the other the common bat-wing burner; the Argand burners that were used for air-gas differ from the Argand burners used for coal-gas in that the perforations in the burners were larger; the bat-wing burners which were used
195 had the same general external and internal form as those that were used for coal-gas, but differed in the size and shape of the orifice. The reason for such difference in the size and shape of the orifice was due to the difference in chemical composition of air-gas as compared with coal-gas. Hydro-carbon oils contain but a small proportion of hydrogen, being about eight-tenths carbon, while coal-gas is about eight-tenths hydrogen. It is a well-known fact that the larger the proportion of carbon in an illuminating compound, as compared with hydrogen, the lower the pressure under which it must burn, and hence the necessity of using the burner with the larger orifice, in order that a lesser degree of force might be required to spread the flame and to reduce the velocity of the gas issuing from this orifice; simple bat-wing burners, such as I have described, were used for air-gas as early as 1862, and are used in larger numbers to-day than any other class of burner; for certain classes of property, as large manufactories, they are superior to any other; bat-wing burners having the usual form of the orifice for burning coal-gas have been in use more than fifty years; the same kind of Argand burners as were used in 1862 for burning air-gas are now more commonly used than any other kind of burner for burning air-gas in dwelling-houses, stores, public buildings, and property of like character, as they furnish a steadier and stronger light than any other kind of burner used; another reason why they differed was that in bat-wing burners, such as were used for coal-gas, the orifice would be so fine that air-gas could be burned from them only when the carbureted air was composed of certain proportions of air to vapor, the condition being the relatively large proportion of vapor of gasoline to the amount of air; when these proportions varied and the proportion of air became greater then this ordinary coal-gas burner would fail to give a suitable light; the same kind of bat-wing burner, but hav-
196 ing a larger orifice, could burn this compound when the proportions of air to said vapor were as 9 to 1, while, on the other hand, the bat-wing burner, with the fine orifice, could only burn this compound when the proportion of air to vapor was about equal; for these reasons, the bat-wing burners used for burning air-gas differed from bat-wing burners which were used for burning coal-gas.

Q. When were adjustable gas-burners first introduced, by whom, and what was the occasion of their use?

A. Adjustable gas-burners, arranged in many ways, have been used for at least twenty-five years.

(Objected to as immaterial and irrelevant.)

One Daniel H. Solliday, of the city of Philadelphia, obtained letters patent in 1849 for a bat-wing gas-burner having a surrounding tube, ring, or band, which was made to adjust (objected to as incompetent

and immaterial) by raising and lowering, and for the purpose of controlling the flow of gas; in 1863, one Frederick Lunkenheimer, of Cincinnati, Ohio, obtained letters patent for an adjustable gas-burner having an interior tubular valve, which was made to so adjust as to control the quantity of gas which passed through the burner; in 1866, Doctor Coolidge, of Boston, obtained letters patent for an adjustable gas-burner, arranged with a surrounding-tube, the top of which tube impinged against the conical tip of the burner by raising or lowering the surrounding-tube, and permitted an increase or diminished supply of gas to be obtained; in 1867, Berg & Blessing, of Springfield, Mass. (counsel for the defendant objects to the witness testifying anything about inventions, either giving the dates or the construction, or the purpose of the invention, without producing the patent specifications), applied for letters patent for an adjustable gas-burner having a surrounding-tube and a perforated base, said to be made so that
197 when screwed down it would impinge upon the upper side of the conical tip, the operation of which permitted an increased or diminished supply of gas; in 1868, Horace R. Barker, of the city of Lowell, Massachusetts, invented an adjustable burner containing the same elements, and operating practically in the same way as the one previously described; in 1870 letters patent of the United States were obtained by Theodore Clough, the defendant, for an adjustable gas-burner, on June 14th; in July of 1870, letters patent were granted to myself for an adjustable bat-wing burner, the patent on which this suit is brought; in December of 1870, I think, another patent was obtained by Theodore Clough for an adjustable bat-wing burner, for an alleged improvement on the patent previously issued to him on June 14th, 1870; a number of the adjustable burners mentioned were made and used for burning coal-gas, and, indeed, any of those described, or nearly all of those described, are still adapted for burning coal-gas, if so desired, as well as for any other kind of gas. For the past fifteen or twenty years the attention of inventors has been directed to the construction of burners which would adjust in various ways, the object being to increase and diminish the flow of gas at will. The occasion for the demand for adjustable burners arose from the fact that where people burned coal or other similar kinds of gas, it was desirable to have in some parts of the building a large light, and in other parts smaller ones. There have been many kinds of burners containing tubular valves, and all other appliances which usually enter into an adjustable burner, arranged in various forms within the past fifteen years, besides those which I have specified. Adjustable burners, which are used for burning air-gas, are more particularly required when the quality of said air-gas varies, and it becomes desirable to increase the volume of said gas flowing through the burner, if the gas be too poor, or to diminish the said volume if the gas be too rich; in the case of coal-gas, the demand for the ad-
198 justable burner arose from the desire to control the size of the light, while in the case of the adjustable burner used for air-gas the demand arose from the desirability of maintaining the quality of the light by permitting a large escape of the gas, if the gas were too poor, or a diminished escape if it were too rich.

Q. Please look at the burner now shown you, and at the patent granted to Daniel H. Solliday March 29th, 1849, and say whether the burner is made in conformity to the specification in that patent.

(Objected to as immaterial and irrelevant.)

A. I should say that the said burner was made in conformity with the burner marked number one on the drawings of said patent, with

the exception that the orifice of the burner, or the slit through which the gas passes, does not appear to be sawed down the burner so far as on the burner shown in the drawings.

(Patent offered in evidence, marked Complainant's Solliday, February 25, 1875.)

(Objected to as immaterial and irrelevant.)

(The burner is also offered in evidence marked Complainant's Solliday Burner, February 25, 1875.)

(Same objection.)

Q. Please explain the construction and operation of that burner?

(Same objection.)

A. The burner consists, first, of an ordinary bat-wing burner; it has an external screw on the enlarged portion of the pillar; a tube, having an internal screw, is placed upon the burner, which screws down on the burner pillar by means of the external screw before described; its operation is as follows: When the said surrounding-tube is screwed clear down to its shoulder, then the gas passes through the full slit of the burner; if the surrounding tube be raised, as it is designed to be, it covers a portion of the lower part of said slit, which has the effect to narrow the flame; the gas from the lower part of said slit escapes
199 from within the surrounding-tube, and passing upwards unites with the flame which has escaped from the slit above the tube, and the effect is to thicken the flame and thus to increase the light. It is a well known fact that the thickness of the gas flame should depend purely upon the quality of the gas being burned; for instance, a gas of very high illuminating power should be burned from a very narrow orifice, or, in other words, the flame should be thin, while with gas of a poorish quality, say of twelve-candle power, the flame should be much thicker in order to give the most economical result from the amount of gas burned; therefore, the operation of the Solliday burner is to effect the thickening of the flame when desired, or to diminish its thickness, as the case may be. In case that a poor quality of gas is used in said burner, if the tube be turned upward, the flame is narrow, and the gas which escapes from the lower part of the slit of the burner acts as a supplemental feed to the flame, thereby thickening said flame and increasing the light.

Q. Please describe the construction and operation of the burner number two, annexed to the said Solliday patent.

(Objected to as immaterial and incompetent in this, that the witness has no such burner before him, does not profess ever to have made any such burner, and that the specifications and drawings must be allowed to speak for themselves.)

A. The said burner, number 2, consists of an ordinary bat's-wing burner, having a surrounding-tube similar to the one previously described, excepting this has a notch in the two sides of its top and opposite each other; in addition to the surrounding-tube, there is a nut which attaches to the burner; the surrounding-tube, when placed upon the burner, attaches to the nut; a pin, inserted in the burner pillar, passes from the slot in said surrounding-tube, which prevents
200 said tube from turning round; by turning the said nut, the said tube is raised or lowered as the nut is turned to the right or to the left, but the tube does not revolve. The effect of raising and lowering said tube in the burner No. 2 of the Solliday drawings is the same as the raising or lowering the tube in burner No. 1 of said drawings, with the exception, however, that the notches in the two sides of the top of said tube tend to spread the flame to some extent, if it has been

thickened by the supplemental supply of gas which flows up in the surrounding-tube from the lower edges of said slot when said tube is raised.

Q. How extensively are these Soliday burners used, in general terms? (Objected to as immaterial and irrelevant.)

A. I saw many of them in use twenty years ago.)

Q. In your opinion was the Solliday burner an improvement on the bat's-wing burner?

A. In my opinion it was.

Q. Please look at the burners now shown you, and state what burners they are, if you know; and how long burners such as these have been in use; describe their mechanical construction and operation.

(Objected to as immaterial and irrelevant.)

A. These burners were made by H. R. Barker & Co., of Lowell, Mass., in 1868; one of them was in use, to my knowledge (the burner marked H. R. B. on the burner itself) in the workshop of H. R. Barker & Co., in the city of Lowell, from 1868 to 1874, to the time of the trial before Judge Shipman, when Mr. Clough was the complainant and the Gilbert & Barker Manufacturing Company were the defendants; the other one was in use at the shop of the Gilbert & Barker Manufacturing Company, of Springfield, Mass.; this burner consists, first, of a bat's-wing burner; on the upper end of the pillar, near the tip, is a cone, which serves as a valve-seat; the slot of the tip extends downwards the entire length of the pillar; a surrounding tube is placed upon said pillar, attached thereto by means of a screw. I should have said
201 that said burner pillar had an external screw near its base; the surrounding-tube, having an internal screw at its lower end and a conical disc at its upper end, is placed on the pillar, and attached thereto by means of the screw before described; the upper end of said tube is larger than the tip which it surrounds; when said tube is screwed clear down on the pillar, the upper end of said tube impinges upon the cone near the tip of said burner-pillar, the effect of which is to prevent the escape of gas from within the said tube at its top. When the burner is arranged in this position it is, in effect, an ordinary bat's-wing burner; the slot in said tip may be entirely closed, should the surrounding-tube be made to impinge hard enough upon the said cone near the tip of the burner; should the slot be closed by screwing down the tube, the effect of raising the surrounding-tube slightly would be to cause said slot to resume its natural position, and permit a volume of gas to escape from said tip, in proportion to its degree of coarseness; by raising said tube to a greater height, the conical line of the upper end of said tube is raised from its seat, namely, the cone on the burner-pillar, and an additional supply of gas will pass from the burner-pillar into the surrounding tube; thence up through the surrounding-tube and out of its top, which supply will mingle with the gas which escapes from the said tip; the effect of the operation of said burner, when used to burn gasoline gas, is to afford an increased or diminished supply of gas, as may be desired, the quality of the gas considered; the surrounding tube, considered in connection with the cone on the pillar of the burner, operates as a tubular valve for the purpose of controlling the flow of gas, as before described.

(The two burners are offered in evidence, marked Complainant's Horace R. Barker Burner, February 25, 1875. Objected to, as immaterial and incompetent.)

Adjourned to February 26th, 1875, at 12 m.

202 NEW YORK, *Feb. 26th*, 1875.

Pursuant to adjournment.

Parties present.

Examination of John F. Barker, continued:

Q. How many burners like the Horace R. Barker burner did you have in use at Springfield, and during what time?

(Objected to as immaterial and irrelevant.)

A. I had some six or eight burners in use during the year 1869; I also saw some twelve or fifteen others in use at the shops of the H. R. Barker Company, at Lowell, Massachusetts.

Q. Did those six or eight operate in the same way, or differently, from the one or two which you described yesterday?

A. The operation of all was practically alike.

Q. Since your examination, yesterday, have you tried with gasoline gas the two burners, Exhibits Complainant's Solliday Burner, February 25th, 1875? and if so, state their operation. State fully?

(Objected to as immaterial and irrelevant.)

A. I have tried the two burners mentioned with the gasoline gas.

Q. State where.

A. At the office of the Gilbert & Barker Manufacturing Company, 238 Canal street, New York City. The burner which was described as "Solliday No. 1," when screwed to the gas-pipe, and when the surrounding-tube is screwed down to its shoulder, operates like an ordinary bat-wing burner, such as is used for coal-gas; when the tube is screwed upward, a portion of the lower ends of the slit in the burner-tip is covered by the said surrounding-tube; the effect is to narrow the gas flame to some extent, and to cause the gas which escapes from the lower ends of the slit, inside of the surrounding-tube, to pass up the said tube under a low velocity, where it becomes mingled with
203 the gas which escapes through the slit of the tip, which is not covered by said tube; this operation permits the turning on of a greater force of gas at the gas-cock of the gas fixture, whereby more escapes through the slit in the said burner-tip that is covered by the surrounding-tube; said increase and the gas so escaping passing up said tube and mingling with the gas which escapes from the uncovered slit increases the size and brilliancy of the light, which has the effect to make a thicker flame, which burns with a lower velocity than the same gas would if it all escaped from the slit of the burner-tip when the surrounding-tube is screwed down to its shoulder and the slit entirely uncovered; with the surrounding-tube screwed up, as before described, and consequently a portion of the slit covered by said tube, the gas escaping from the lower ends of said slit and within said tube, it passes up said tube and mingles with the gas escaping from the slit which is uncovered, and causes the said gas to act as a supplemental feed to the gas which escapes from the uncovered portion of the slit in said burner-tip; the operation of this burner has the same effect, in a degree, as though the orifice of the burner was enlarged or contracted, as the case may be—as indeed do all adjustable gas-burners which operate to furnish a supplemental feed of gas.

Q. What is the effect, if any, in respect to thickening the flame, or in regard to producing a visible circular ring of light?

A. It is a well known fact that the particular width of the slit in a bat-wing gas-burner is a question of what the quality of the gas may be that is burned from it; for instance, two ordinary bat-wing burners may be used on any kind of gas, each consuming exactly 4 feet of gas

per hour; the one may have a narrow or fine slit, and yet of sufficient length to consume the said four feet; the flame emitted from such a burner would be broad and thin. It is a well known fact that
204 the source of luminosity in illuminating gas is due to the incandescence of particles of solid carbon which are held in suspension in the hydrogen, which forms the base of the gas, and that these particles of carbon are the only source of said luminosity; the longer said particles of carbon remain incandescent, the greater the amount of light that will be afforded from a given quantity of gas. In the burner having a fine slit (as the one last described), the effect of having the broad thin flame is to expose a large area of the gas to the cooling influences of the air, and, as a consequence, the said particles of carbon are quickly cooled, and a pale, blue, feeble light is the result; on the other hand, a common bat-wing gas-burner may be made, consuming exactly 4 feet of gas per hour, which has a wider slit in the tip than the one last mentioned, but not so long; in this case, the area of flame exposed to the air would be less and the flame would be thicker; the particles of carbon in this thicker flame would not become as quickly cooled as in the thinner flame before described, and as a consequence, would remain incandescent for a greater length of time, and the said 4 feet of gas consumed from such a burner, having the thicker flame, would afford a larger supply of light, and consequently the gas would be used with far greater economy. In order to burn illuminating gas of any kind with the greatest economy and obtain the best light therefrom, the thickness of the flame or the width of the slit of the burner must be made, in effect, in proportion to the quality or to the candle-power of the gas burned; hence the improvement in the said Solliday burner, which accomplished the result of thickening the flame, and thereby practically increasing or diminishing the orifice, which was done by furnishing the supplemental feed from within the surrounding-tube to the gas which escaped from the uncovered portion of the slit in the tip. I would further say that when the said Solliday burner is in operation with air-gas, the flame is materially thickened by screwing up
205 said tube, and the supplemental feed of gas, before described, is plainly discernible in a circular ring of flame from the gas which escapes from the top of said tube.

Q. Have you read, and do you understand the specification in the Clough patent set up in defendants' answer? If so, please state the construction and operation of a burner made in conformity to that specification; and state whether you have seen burners in operation made in conformity to that specification.

(So much of the question as asks the witness to state anything from these specifications and drawings in Clough's patent is objected to.)

Preliminary interrogation by defendants' counsel to the capacity of the witness as an expert.

Q. You have not, yourself, been engaged in the actual operation of making gas-burners, have you, Mr. Barker?

A. I have made the drawings for gas-burners. I have made a few gas-burners with my own hands. I have superintended the construction of many.

Q. Of what pattern or make were those which you have personally made with your own hands?

A. I have made the ordinary bat-wing burner, and also the burners for which I obtained letters patent in July of 1870.

Q. There is not any necessary or actual similarity between the form

and operation of iron and brass works and machinery for using water or steam and those for using gas, is there?

A. There are many kinds of iron and brass goods which are used in the use of steam or water, which are used in the use of gas, and are precisely similar.

Q. Are not all of the gas-burners which you have described entirely different in their structure and form from any instruments employed in the use of water or steam?

A. I have seen gas-burners used for the purpose of emitting jets of steam and water also.

206 Q. You never made them for that purpose, or sold them for that purpose?

A. I have sold them for that purpose.

Q. You never made them for that purpose?

A. I don't think I ever did construct them specially for that purpose.

Q. About how many gas-burners, all told, have you in person actually made; you may embrace all patterns, you may embrace all burners that you ever made in experimenting for the purpose of improving or developing your ideas on that subject?

A. I presume I may have made two or three hundred.

Q. You are not a solicitor for patents?

A. I am not.

Q. When you want to obtain a patent you employ solicitors for that purpose, do you?

A. I do; I usually dictate my own specifications.

Q. You are not a professional expert in the matter of advising and testifying about patent rights, are you?

A. I am not; I have testified as an expert, however, in some one or two cases.

Q. Did you ever testify as an expert in any patent right causes except one in which you or the complainant in this suit was interested?

A. I never have.

Q. Did you ever testify as an expert in any patent right cause, before the trial of the issues at law in the equity cause of Theodore Clough against this complainant?

A. I have.

Q. How often?

A. I think in one instance before.

Q. That was not about gas-burners, was it—not exclusively?

A. About gasoline machines for generating gasoline gas; it
207 was not exclusively the subject of gas-machines, but all the appurtenances connected with the burning of said gasoline gas entered into the testimony.

(Counsel for defendant objects to the witness answering the last question propounded by counsel for complainant, upon the ground that he is not sufficiently shown to be an expert upon that particular question.)

WITNESS, (continuing). I have seen burners in operation made in conformity to the specification. I have read and think I do understand said specification and the construction and operation of said burners. The burner in said specification is made in three parts and consists of a bat-wing burner, a surrounding-tube, and a tubular valve; the bat-wing burner has an internal screw at its lower end, also an internal screw on the pillar of the burner, and also has perforations through the pillar of the burner, near to the external screw; the external screw is placed there for the purpose of attaching thereto the said surround-

ing-tube; the internal screw on the lower end of said burner is placed there for the purpose of attaching the tubular valve to said burner; the said surrounding-tube is made straight and has in one end an internal screw by means of which it attaches to the external screw on the pillar of said burner; in the pillar of the said burner, at a point directly above the said perforations, there is a shoulder or seat for the tubular valve which passes up within said burner; the tubular valve is made with an external screw on its base, placed there for the purpose of attaching it to the internal screw of the said burner; the said valve has also an internal screw at its lower end for the purpose of attaching it to the pipe of a gas fixture; from the lower part of said tubular valve a small tube projects which forms a part of the tubular valve; when the said burner is screwed clear down upon the said tubular valve, the end of the valve impinges against the shoulder or seat in the interior of said burner-pillar; when the burner is in operation, and the
208 said burner is screwed clear down on the tubular-valve, then there is but one straight gas-way from the gas-pipe to which the burner is attached to the tip of the burner, and in such position it operates in precisely the same way, and with the same results as any ordinary bat-wing burner; if the burner be screwed upwards on the tubular-valve, the seat or shoulder in the pillar of said burner is drawn away from the end of said tubular valve, and if it be screwed up far enough, the perforations which are made through the pillar of said burner will be above the end of said tubular valve; in this position there are two currents of gas passing from the burner, one current being from the slit in the tip, the other current passing through the perforations in the burner pillar and into the tube which surrounds the burner, from whence it is conducted upward by said tube, and mingles with the gas which may be escaping from the slit in the tip; said tube is fastened rigidly to said burner, and when said burner is screwed up or down, the surrounding-tube turns with the said burner; the function of said surrounding tube is to convey the gas which escapes through the perforations in said burner-pillar to the tip of the burner, and it performs no other office; when the burner is screwed up or down, and if there be gas escaping from said burner, and lighted, the flame from the burning gas revolves with the said burner; indeed, the tubular-valve is the only part which does not move when the burner is screwed up or down; the effect of screwing the burner up, and thus permitting a supplemental supply of gas to be carried up the tube and to mingle with the gas which may escape from the tip, is to increase the thickness of the flame which may be burning from said tip, and in this manner the orifice of the burner or the thickness of the flame is made proper for the quality of the gas; the effect of this supplemental feed is precisely as though the flames of two ordinary bat-wing burners which had a thin slit were brought together on an angle of 45°; in such case, the
209 union of the two flames would cause the one flame to be much thicker, and more than double the light could be obtained from the one flame than was obtained from the two, with the same consumption of gas.

Q. When did you make the first burner which you made in conformity to the specification in complainant's patent Exhibit Barker?

A. To the best of my recollection, I made such burners about February of 1870.

Q. When were any of such burners first put upon the market for sale?

A. Some time in April of 1870, I think.

Q. Where?

A. At the office of the Gilbert & Barker Manufacturing Co., at Springfield, and in the same company's office in New York City.

Q. Are the burners D and E burners which were manufactured in accordance with the specifications of Exhibit Gilbert & Barker, complainant's patent, and were those two burners made by that company?

A. Burners D and E are made in conformity with the specifications of said patent, and were made by complainants.

Burners D and E, which were exhibits in the suit of Theodore Clough against the Gilbert & Barker Manufacturing Company, are offered as exhibits in this suit, and are marked D, "John F. Barker Burner No. 5." E, "John F. Barker Burner No. 4."

Q. Which of those two descriptions of burners did the complainants principally manufacture?

A. Burner No. 4, marked E.

Q. Of the particular pattern Exhibit D, very few were made?

A. Yes.

Q. Please describe the construction and operation of a burner made in accordance with the specification and drawings of complainant's patent of the pattern Exhibit E?

210 A. The burner E is made in two parts, the one part being a bat-wing burner, the other part being a tube which is made to surround said burner; the said burner is provided with an external screw at its base, placed there for the purpose of attaching the surrounding tube which revolves thereon. It also has an internal screw at its lower end, placed there for the purpose of attaching it to a gas-pipe. It also has a number of perforations through the lower and larger part of the burner-pillar; said perforations being made below the top of the external screw. The straight part of the tube which surrounds said burner has two diameters. The lower and larger part of said tube has an interior screw, placed there for the purpose of attaching it to the external screw, which is used on the lower and larger part of the burner-pillar. Said tube has an enlargement just above the top of the internal screw; said enlargement forming a chamber within said tube; said chamber being of greater diameter than any other portion of said tube. When the said burner is in operation, the said surrounding-tube is attached by means of the internal screw of the tube to the internal screw of the burner-pillar. When the said tube is in such a position on the burner-pillar that the upper end of the internal screw of the tube is even with the upper end of the external screw of the burner, then the perforations which pass through the screw of the burner-pillar are closed or covered, by the internal screw of the said tube. As arranged in this position it is, in effect, an ordinary bat-wing gas-burner, with no other egress for the gas than that of the slit in the tip. When gas is burning from the tip of the burner, the burner being in the position last named, if then, the surrounding tube be turned downward, the upper end of the internal screw of the tube passing to a point partially or wholly below the perforations through the external screw of the said burner, much or little gas is permitted to escape through the said perforations into the surrounding tube, in pro-

211 portion as the area of the perforations may be uncovered by screwing said tube downwards. When the upper end of the internal screw of the tube begins to pass off from the perforations, when being screwed down, the enlarged chamber in said surrounding tube passes over the perforations which are through the screw of the burner-

pillar; the gas which escapes through the said perforations enters the chamber of the surrounding tube, and from thence is conducted upwards through the smaller part of said tube to the tip of the burner. The said surrounding-tube in this burner E. performs two functions when operated to open the perforations, first, that of uncovering the perforations through the screw of the burner-pillar; second, to convey the gas which may have escaped through said perforations to the tip of the burner. The said burner is screwed rigidly to the gas-pipe, and neither the burner nor the gas-flame revolves or moves when the surrounding tube is screwed up or down. If the surrounding-tube be screwed upward far enough, so that the upper edge of the interior screw of the tube comes above the upper edge of the external screw of the burner-pillar, then, in this position, the said burner operates substantially in the same manner as that of the Solliday burner previously described, viz, to prevent the escape of the gas from the lower edges of the slit in the tip at a high velocity, and cause it to ascend through the upper end of the tube at a low velocity and to mingle with the gas which is escaping from the uncovered portion of the slit in the tip of the burner.

The other burner of said specifications, marked D, is similar in construction and operation to that previously described, with these exceptions:

First. That the surrounding tube has no chamber.

Second. That the perforations through the pillar of the burner are above the upper edge of the external screw.

212 Third. That the internal screw in the lower end of the tube does not cover the perforations in said burner-pillar.

Fourth. The external screw on the burner-pillar is shorter. A shoulder in the surrounding-tube impinges against the larger part of the burner-pillar above the perforations, and when in this position no gas can escape from the said perforations into and upward through said surrounding-tube. When the said surrounding-tube is raised upward the shoulder in said tube moves away from the larger part of the burner-pillar, which permits the gas to pass up through the said tube and mingle with the escaping gas through the slit of the burner-tip. Other than this, the operations of the burner are substantially like those of the burner E, previously described.

Q. Please state whether the mechanical construction of burners made in accordance with the specification of complainant's patent is the same, or the same substantially, as the construction of burners made in accordance with the specification and drawings of the defendant Clough's patent in evidence.

A. The construction of burners made in accordance with complainant's patent is entirely different from that of those made in accordance with the drawings and specifications of defendants' patent, which are of a different device, are different in principle and are different in mode of operation.

Q. Please specify the difference in the construction and in the principle or mode of operation. By principle or mode of operation I mean the same thing.

A. The burner made in accordance with the defendant's specifications and drawings has an independent tubular value, said value of which attaches rigidly to the gas-pipe, the upper end of which has a seat within the burner-pillar. The said burner also has a straight tube surrounding the upper and smaller part of the pillar, and, when in operation, attached rigidly and immovably thereto. The said tube merely per-

forms the office of conveying the gas which may pass through
213 the perforations to the tip of the burner. When operated, the entire burner revolves as well as the gas-flame. The surrounding tube does not raise or lower, has no different position whatever with reference to the tip of the burner at one time than at another. The position of the flame of the said burner, when in operation, must depend purely on the desired supply of gas, which may be obtained by turning said burner more or less. If, for instance, the requisite amount of gas for proper combustion is obtained when the flame is in one position, in that particular position must that flame remain until the quality, or until the relative proportions of air and vapor of gasoline gas may change. Thus the flame of the said burner is liable to stand in any position, whether it may be so desired or not. The independent tubular valve of said burner has no connection whatever with the surrounding tube of said burner. It is an independent and separate piece of mechanism. If the surrounding tube be revolved on the screw by which it is attached to the burner-pillar, it has no effect whatever upon the independent tubular valve. It has no effect whatever of opening or closing the perforations through the burner-pillar. If the burner be revolved on the independent tubular valve, then the said valve has no effect whatever upon the surrounding-tube. The said surrounding-tube and the tubular valve are two separate and independent pieces of mechanism, performing different functions, and in no case performing the same functions.

In the burner constructed in accordance with the drawings and specifications of complainant's patent, these are but two parts, viz, the burner-pillar and the surrounding-tube.

Adjourned to Saturday, Feb. 27th, 1875.

214 NEW YORK, *February* 27, 1875.

Pursuant to adjournment.

Parties present.

Examination *by* John F. Barker resumed.

WITNESS. The said burner attaches rigidly and immovably to the gas-pipe. The surrounding-tube revolves on the said burner, and as it is turned up or down, either covers or uncovers the perforations through the burner, as the case may be. When the surrounding-tube is revolving, neither the burner nor the flame from the burner moves at all. The surrounding-tube performs two functions, viz, that of covering or uncovering the perforations through the burner, and of conveying the gas which may escape through said perforations to the tip of the burner. The top of the surrounding-tube has no fixed or permanent position relative to the tip of burner; it may occupy a higher or a lower position on said tip accordingly as circumstances may demand that it shall be moved up or down; thus the differences in said burners are, that defendant's burner as compared with complainant's is a costly, complicated piece of mechanism, while complainant's burner is a cheap, simple, and effective machine, and of an entirely different device. The difference in mode of operation or principle is that in defendant's burner, the entire burner revolves on an independent tubular valve revolving the gas flame at all times when the burner is screwed up or down, while complainant's burner does not. It has no independent tubular valve. The burner is always stationary, and the flame does not revolve when it is operated.

Q. You have stated that in regulating the Clough burner the flame revolves, and that it does not revolve in regulating the burner made under complainant's patent; state to what extent, in your opinion, that matter is material; state fully.

215 A. There is always a right way and a wrong way of placing the burner on a gas-fixture with reference to the position that the flame must have; for instance, if a burner be attached to a bracket on the wall of a building, then in order to get the best result from the light of the burner, the flame should stand flatwise to the wall, in order that the light may be reflected by the wall through the space in the room. Again, if a burner should be so placed on said bracket that the flame stood diagonally across said bracket, then an awkward appearance would be given to an ornamental gas-fixture which would be decidedly objectionable. In case burners are placed on chandeliers having a number of burners, then the burner should be so set that the flame would stand squarely across the arm of the chandelier. That it be placed in this position is material to the proper appearance of an ornamental gas-fixture. If burners are placed upon a pendant, either single or double, which may depend from the ceiling of a room, then the broadside of the flame of said burner should permanently stand in the direction of the greatest space to be illuminated, either squarely across the arm of said pendant, or lengthwise with it. In such case, appearance as well as utility is considered; where gas-burners are used in manufactories or workshops, then it becomes important that the flame should stand permanently in such a position that the greatest amount of light will be reflected upon the work on which the operatives are engaged. As before stated, in the burner made in accordance with the drawings and specifications of defendant's patent, the flame of said burner can have no fixed position. It is liable to stand in any direction, lengthwise or across the arm of the fixture, or diagonally to a greater or less degree. In my opinion, in this respect, the operation of said burner constitutes a very material objection, and one which would be decidedly objected to by the greater portion of consumers of gas.

216 Q. As a matter of fact, to what extent have adjustable bat wing burners in which the flame revolves by regulating it gone into actual use in this country?

A. I have seen but very few of them in use, and in my opinion, there has been but a very small number that have been introduced and sold.

Q. Are such burners, which are made in accordance with the specifications in defendant Clough's patent, at the present time manufactured and sold anywhere to your knowledge?

(Objected to as immaterial and irrelevant.)

A. I have no knowledge whatever that they are either manufactured or sold anywhere in this country.

Q. What is the comparative cost of the manufacture of burners like those described in defendant Clough's patent, and those described in complainant's, Gilbert & Barker, patent?

(Same objection.)

A. In my opinion, a burner made in accordance with defendant's drawings and specifications would cost at least fifty per cent. more than a burner made in accordance with the drawings and specifications of complainant's patent.

Q. Why?

A. First, that in complainant's burner there is no independent tubular valve to construct, and consequently there is no labor expended for constructing the seat for an independent tubular valve. The tubular

valve which exists in defendant's burner does not exist in complainant's burner. It is much less work to make the pillar of complainant's burner than it is to make the pillar of defendant's burner, for the reason as before stated, that in the pillar of defendant's burner there is a seat on which the independent tubular valve strikes; in order to make this seat there must be two internal diameters to the pillar and the burner, in order to form the shoulder, which is the seat of the valve. This necessitates the operation of handling the burner-pillar twice in its manufacture, whereas, in complainant's burner, which has no valve-
217 seat in the pillar of the burner, the hole through the said pillar is straight, has but one diameter, and therefore, can be drilled through with one operation. It is practically as much work to construct the independent tubular valve of defendant's burner as it is to construct the pillar of the burner. In order to have it operate properly the workmanship must be skillfully executed and be made to fit to a nicety. As before stated, this independent tubular valve is entirely wanting in complainant's burner, as well as its seat in the pillar of the burner, and for the reasons stated, in my opinion, it costs at least fifty per cent. more to make defendant's burner than it would complainant's.

Q. Please state whether, in your opinion, your burner is a better burner than Clough's burner, and your reasons?

(Objected to as incompetent and immaterial.)

A. In my opinion it is, and my reasons for my opinion are that the very objectionable feature consisting of the turning of the flame, which exists in defendant's burner, does not exsist in complainant's burner; it is better, also, because it is less complicated and because it is cheaper.

Q. Please state whether or not, in your opinion, the differences between your burner and Clough's burner were such as to require invention to make your burner, in one who had never before seen a burner like the one described in your patent, and assuming that such person had seen the specifications and drawings of Mr. Clough's patent, and state your reasons for any opinions you may give?

(Objected to as incompetent and immaterial.)

A. In my opinion the differences between the two burners mentioned are such that it would require invention to make complainant's burner; and my reasons are that no description of complainant's burner in any form exists in the drawings and specifications of defendant's patent; the device of complainant's burner is not shown there; its principle or mode of operation is not shown there; there is nothing what-
218 ever about those drawings or specifications that could or would inform any person skilled in the art how to make complainant's burner; there is no reference whatever in said drawings or specifications to the surrounding-tube which is movable or operative upon the pillar of the burner, or one which operates to cover or uncover by screwing up or down the perforations through the pillar of the burner; the specifications of said patent describe a particular device which is plainly shown in the drawings, and therefore, I say that in my opinion inasmuch as neither the device, the construction, principle, or mode of operation of complainant's burner are shown or described in the specifications and drawings of defendant's patent, therefore it would require invention in order to make complainant's burner.

(Defendant's counsel moves to strike out all the portions of the foregoing answer which undertake to state what the specifications and drawings of defendant's patent are, or what they state or describe.)

Q. Had you seen defendant Clough's patent, or specifications and

drawings, before you made the invention described in complainant's patent?

(Objected to as immaterial and irrelevant.)

A. I had not.

Q. What, if any, time did you expend—what did you do when, as you say, you made your invention?

A. My first experiments with gas-burners for burning gasoline gas commenced early in 1865, at the U. S. armory, at Springfield, Mass., and have continued to the present time. Early in 1866 I was engaged in superintending the manufacture and erection of what were known as atmospheric air-gas machines, and continued introducing such machines until about August, 1867. I then commenced the manufacture, sale, and introduction of a different kind of gas-machines, which operated by power. I would mention that the atmospheric machine was
219 operated by the gravitation of the gas. Very early in 1866, and until I made my invention in 1870, I was constantly engaged or engaged much of my time in experimenting with all kinds of gas-burners to adapt them for burning gasoline gas, and a great many kinds of burners arranged in various ways, for both heating and lighting purposes. About February, 1870, I was engaged or devoted much of my time to such experiments, and about that time, having conceived the idea of the arrangement of complainant's burner, I was engaged in manufacturing experimental burners, in order to perfect one that would be right; to this end I kept a brass finisher, with lathe and considerable tools, employed for some weeks in complainants' factory constructing burners in various forms which I described to him. These experiments continued through March and April, I think, and resulted in the invention of complainants' burner, for which I applied for a patent, and received the patent therefor of July 26th, 1870.

Q. Please state whether any of the elements, taken separately and by themselves, of the combinations recited in the first and second claims of the defendant Clough's patent were or were not new in the year 1869 or 1870, or prior to the time at which Mr. Clough states he made his invention?

(Objected to as immaterial, and upon the ground that the novelty and utility of Clough's patent are not put in issue by the pleadings in this case.)

A. In my opinion, every element which enters into the combination of the burner in defendant's patent was old and had been used before the time mentioned; these elements consist, first, of a bat-wing burner having perforations in the pillar of the burner; second, of a surrounding-tube; third, of a tubular valve.

Adjourned to Thursday, March 4th, at 11 a. m.

March 4th, 1875, adjourned by consent to Tuesday, March 9th.

220 MARCH, 9TH, 1875.

Pursuant to adjournment.

Parties present.

Examination of John F. Barker continued:

Q. What instances, if any, can you specify of the use of the separate elements of such combination prior to the date of the defendant Clough's patent?

(Objected to as immaterial and irrelevant.)

A. The Solliday burner, being a bat's-wing burner, has a surround-

ing-tube which moves up and down, and when moved up has, in effect, perforations in the burner-pillar below the top of the tube; the Lunkenheimer burner has a tubular valve which, when moved up or down, has the effect to increase or diminish the amount of gas which passes through the burner; the Coolidge burner has a surrounding-tube, and also perforations at the base of the burner; the Horace R. Barker burner has a surrounding-tube, and has also perforations at the base of the burner, and has a tubular valve at its tip; there are many other kinds of burners which have tubular valves arranged in various ways. Tubular valves in gas-burners of various forms have been used for many years, and form one of the principal features of nearly all kinds of adjustable burners which are used for burning gas of any kind.

Q. Please state whether, at the date of defendant Clough's alleged invention, as is set forth in said exhibit, the combination set forth in the first claim of said patent was new or old, and any instances which you may have in your mind of the prior use of such combination as is set forth in said first claim, if you know of any such?

(Same objection.)

A. In my opinion, the combination was old; the Horace R. Barker burner is a bat's-wing burner, with perforations at the base, and has a surrounding-tube; when in operation, it may be open at the top;

221 the Coolidge burner is a bat's-wing burner, which has a surrounding-tube, and perforations at its base; at certain times the top of said tube is open when in operation; the Solliday burner is a very marked instance, indeed, of such combination; it is a bat's-wing burner, and has a surrounding-tube, which is open at the top when the said tube is adjusted in the proper position; then there are perforations in the pillar of the burner, below the top of the tube, the said tube causing the gas to be conveyed from the perforations below the top of the tube, where it unites with the gas which may be escaping from the top of the burner.

Q. What is the principle of the Solliday burner?

(Same objection.)

A. The Solliday burner is a bat's-wing burner, having a surrounding-tube, which can be moved up or down. Its mode of operation is exactly like an ordinary bat's-wing burner when said surrounding-tube is screwed down; if the tube be moved up, the gas-flame is prevented from burning from the lower part of the slit in the top of the burner, and the gas burns from the uncovered portion of the slit in the top only. The gas which escapes from the lower part of the slit in the burner-pillar below the top of the tube passes up in said tube and unites with the gas which escapes from the top, above the tube, which has the effect to thicken the flame and to greatly increase the light. The gas which escapes from the perforations below the top of the tube has a much lower velocity in its passage up the tube than the gas which escapes from the top, and when passing up the tube is fed on to all parts of the gas-flame alike. This supplemental feed is plainly discernible in the form of a ring of flame around the top of the tube, having the same appearance in every particular as the ring of flame which is shown from a supplemental feed in other kinds of adjustable gas-burners.

Q. What is the difference in effect whether the gas is admitted into the surrounding-tube from that part of the slit below the top of the tube or from perforations in the base of the burner?

(Same objection.)

222 A. The difference in effect is one of degree only, the principle of operation being the same.

Q. What is the principle of the Coolidge burner?

(Same objection.)

A. The Coolidge burner has a surrounding-tube which moves up and down on a bat's-wing burner, said tube having a globular tip, a slit extending to its base. If the said tube be moved upwards, its top impinges against the lower side of the burner-tip, which has the effect to cut off any communication between the base of the burner and its tip. It also has the effect to contract the orifice of said tip to a greater or less extent, accordingly as the tube may be turned up. When the tube is in this position the burner operates as an ordinary bat's-wing burner. If the tube be turned down, the slit in the top resumes its natural position, and a communication is also opened from the burner-pillar below the top of the tube to the tip of the burner. The result of moving the tube down as described is to thicken the flame of gas—first, by allowing a greater volume to escape from the tip; and, second, by means of the supplemental feed which passes up from the base of the burner to the tip.

Q. What is the principle of the Horace R. Barker burner?

A. In the Horace R. Barker burner the slit of the burner is extended to its base, and said burner has a cone on its pillar, near its top; it also has a surrounding-tube which can be raised or lowered; if the tube be turned downward, its top impinges against the upper side of the cone of the burner-pillar, thereby cutting off communication between the base of the burner and its tip, and also causing the orifice of the burner to contract; if the burner be turned upward, its top ceases to impinge on the cone of the burner-pillar, the slit of the tip resumes its natural position, and communication is established from the base of the burner up through the surrounding-tube to the burner tip.

223 When the tube is in the last-named position a supplemental feed of gas passes from the base of the burner up through the surrounding-tube and out at its top, where it mingles with the gas which may be escaping from the tip, which results in thickening the flame of gas and in a great increase of light. This supplemental feed is always distributed from all parts of the circumference of the top of the burner-tube alike, and at the point where it unites with the gas which may be escaping from the top of the burner, which is shown by a circular ring of flame. There is no circular ring of flame shown around the tip of an ordinary bat's-wing burner, which has no supplemental feed.

Q. What is the principle of the Clough burner made in accordance with the specifications and drawings in defendant Clough's patent?

(Same objection.)

A. The said Clough's patent is a bat's-wing burner having a stationary surrounding-tube with perforations in the burner-pillar near its base. It also has an internal tubular valve, arranged in such a manner that the burner can be screwed up and down on said valve. If the burner is screwed down the valve is closed, and there is but one passage to the burner-tip, namely, straight through the valve and the pillar of the burner; if the burner be screwed up the valve-seat is drawn away from the valve and communication is opened from the interior of the burner-pillar into the stationary surrounding-tube of the burner and up through the said tube to the burner-tip. When in this position the gas escaping from the internal part of the burner acts as a supplemental feed to the gas which may be escaping from the burner-tip, the effect of which is to thicken the gas-flame and thus increase the light. In this burner a circular ring of flame is also shown at the top of the tube near the burner-tip, as in others previously described. This

burner differs in mode of operation from others previously described, insomuch that in this case the burner revolves on an independent
224 tubular valve which causes the gas-flame to revolve also, while in the other burners before described the burners are stationary; the gas-flames do not revolve, but the tubes revolve on the burners.

Q. What is the principle of complainant's burner?

A. The complainant's burner has a number of perforations through the largest part of the burner-pillar, and has a revolving-tube that can be raised and lowered around a bat's-wing burner-pillar. The said tube when screwed up or down opens or closes the perforations in the burner-pillar, and also conveys a supplemental supply of gas to the burner-tip. If the revolving-tube be turned in one direction, the holes are uncovered, and the current of gas is permitted to pass from the interior of the burner up through the tube to the burner-tip, where it unites with the gas which escapes from the slit in the tip, which has the effect to thicken and increase the brilliancy of the gas-flame in proportion to the amount of gas which is permitted to pass up through the surrounding-tube. If the tube be turned in such a direction as to close the holes through the burner-pillar, then the said burner operates as an ordinary bat's-wing burner, and the light is reduced to correspond with the amount of gas which passes from the tip. When gas is passing up this burner tube it appears in the form of a circular ring of flame at the top of the tube, in the same manner as is shown in the Clough burner, and in the Solliday burner, and other burners which I have described. This burner differs from all others which have been described insomuch that there is no slit extending from the tip of the burner to its base. It has no cover or globular tips; it has no stationary tube or independent tubular valve; the flame does not revolve at any time; it is a simple, plain piece of mechanism of a different device, different in construction and in mode of operation from any others previously named.

Q. Please state whether or not, in your opinion, the Horace
225 R. Barker burners are in fact an improvement upon and a better burner than the Solliday burner for burning air-gas.

(Same objection.)

A. In my opinion they are better in degree only.

Q. In your opinion, is the burner described in Clough's patent an improvement on the Horace R. Barker burner?

(Same objection.)

A. I think it is better in degree.

Q. In your opinion, is complainant's burner better than any of those you have mentioned?

(Objected to as incompetent and immaterial.)

A. I think it is better because it is free from the objections which exist in all the others described; and it is also cheaper; better because the flame is always in one position, and because it has no tubular valves of such a nature as to encumber any part of the burner.

Q. Have the words and figures "patented July 26th, 1870," been affixed to all the burners manufactured by complainant's since that date?

A. They have.

Q. You have stated that ordinary bat's-wing burners for gasoline gas are used extensively in lighting certain classes of property, and that they are better for certain classes of property than any others; please explain the circumstances under which they are better.

A. There are certain classes of property—manufactories for instance—where adjustable burners are objectionable and cannot be used with

economy; for instance, a manufactory may have 300 burners, and if adjustable burners were used in such place there would be 300 burners to adjust; again, in such case, each individual burner is under the control of an operative, and the result is that the burners are not properly adjusted, some of them giving a large and smoky flame, and others a blue and feeble light; the ordinary bat's-wing burner, having a suitable orifice for gasoline gas can be used to the best advantage in these
226 manufactories as before stated; in such a case the gas is adjusted or made of the proper quality for the burners, which is done by means of a connection between the air and gas-pipe; by letting into the gas-pipe a suitable amount of air; the gas is made of proper quality to burn with good combustion, and to give the best results with such burners; moreover, the gas-lights are under the control of a single individual, and are consequently supplied with any quality of gas which may be deemed desirable; they are also the cheapest burners in use, and give equally as good a shaped flame as any other kind; an adjustable burner could be used in manufactories by having its tube adjusted to a certain position, and permitting it to remain in such position, and then, by qualifying the gas to the burner by means of the connection between the air and gas-pipe, it would be the same in effect as the ordinary bat's-wing burner, with the disadvantage, however, of a greater cost.

Q. You have spoken of Argand burners; why are not Argand burners used altogether for air gas?

(Objected to as immaterial and irrelevant.)

A. It is always necessary to use glass chimneys with Argand burners, and in many places glass chimneys are objectionable on account of their liability to be broken, and also on account of the labor in keeping them clean; the draught which passes through the chimney, however, causes the flame from an Argand burner to be steadier than the flame from any other kind of a burner, but in many cases, as in manufactories for instance, the absolute steadiness of the flame is not taken into account; again Argand burners cost more than any other kind of a burner, and therefore they are not used in places where an absolutely steady light is not demanded.

Q. Was the element in your combination for regulating the supply of the gas to the bat's-wing flame known at the date of Clough's
227 invention to be a proper substitute for such tubular valve as he describes in his specification?

(Same objection.)

A. The elements as described in complainant's patent were not known to be a proper substitute for the tubular valve shown in defendant Clough's patent at the time of his invention.

Q. Look at Exhibit A, which is a sample of the burners made by Clough after the date of complainant's patent, and state whether or not, in your opinion, that burner is an infringement of complainant's patent, and state your reasons therefor.

A. In my opinion it is, and my reasons are that it is made in exact accordance with the drawings and specifications of the burner shown in said complainant's patent.

Q. Please look at the burner now produced, marked Horace R. Barker, of this date, and state what it is.

(Objected to as immaterial.)

A. It is a burner constructed in the same manner, having the same mode of operation as Complainant's Exhibit Burner, marked "H. R. B." on the burner, and identified as Complainant's Horace R. Barker Burner,

February 25th, 1875, differing only in the fact that it is of better workmanship; as before stated, it is the same in construction and in mode of operation, and was made by complainants some time in 1874.

Burner referred to put in evidence.

Complainants' counsel offers in evidence a patent issued to F. Lunkenheimer.

(Objected to as incompetent and immaterial; the same received in evidence and marked "Exhibit Complainants' Lukenheimer Patent, W. H. H."

Also patent issued to Theodore Clough, dated November 7th, 1871.

(Objected to as immaterial and irrelevant.)

The same received in evidence and marked "Complainant's Exhibit Clough's Patent, No. 2, W. H. H."

228 Q. Is the burner now shown you one of Mr. Clough's burners made in accordance with the specifications in that patent?

(Same objection.)

A. It is.

Q. Made by Mr. Clough, as you understand it?

A. I do so understand it.

Put in evidence and marked "Clough Burner, Patent No. 2, W. H. H."

Q. What have you to say about that burner?

A. I say that it is a bat's-wing burner, having a hole drilled through both sides of the pillar of the burner, and also through one side of the surrounding-tube; a screw-plug passes through one side of the surrounding-tube and through one side of the burner-pillar; the end of said screw-plug finds a seat in the hole on the opposite side of the pillar; when the screw-plug is screwed up in such manner that its end finds a seat in the burner-pillar, then it operates as an ordinary bat's-wing burner. When the screw-plug is screwed out, the hole through the burner-pillar is opened into the surrounding-tube, and that supplemental feed of gas passes up the surrounding-tube to feed the flame, which may be burning from the tip; this is another form of an adjustable gas-burner, producing the same results as others described, but is a different device, having a different mode of operation from any others introduced in evidence.

Q. Do you or not consider the principle or mode of operation of the burners you have described, to wit, the Solliday, the Coolidge, the Horace R. Barker, the Clough, the John F. Barker, and the Clough, No. 2, the same?

(Objected to as immaterial and incompetent.)

A. I do not; I consider the results are practically alike in each, but that each has a different device, a different mode of operation, and that the results are the same and that they are different in degree only.

229 Cross-examined by defendant's counsel:

Q. Is the Solliday burner the same as complainants' in its structure and mode of operation?

A. It is not.

Q. Does complainant's burner cause or produce any circular ring of flame?

A. When so adjusted that a supplemental feed passes up the tube, it does.

Q. Does defendant's burner produce any such ring?

A. Yes, when gas is fed from its base up through the tube, it does.

Q. Is the Soliday burner the same in its construction and mode of operation as the defendant's burner?

A. It is not.

Q. When did you apply for your patent—the one assigned to complainant?

A. Some time in May, 1870; I cannot give the date in the month.

Q. Describe the construction and mode of operation of Exhibits A and B, in the suit of Clough against the Gilbert & Barker Manufacturing Co., and say if they are not practically the same as his Exhibits D and E, in same suit, and which have been made complainant's exhibits in this suit?

A. The burners A and B referred to, are made in accordance with one of the modifications of complainant's patent, and have been previously described by me; the burner D is precisely the same in construction and mode of operation as the burners A and B; the burner E is the same in mode of operation as the burners A, B, and D, and is nearly the same in construction, differing only as has been previously described by me.

Q. And you would say that A and B are practically the same as D and E, would you not?

A. With the slight exceptions in construction previously described.

A, B, D, and E offered in evidence as defendant's exhibits.

230 Q. Do not all these exhibits, A, B, D, and E, make the same sort of flame as Clough's Exhibit C, in the same suit?

A. All of them have the form of the bat's-wing flame when in operation.

Q. Do they not all operate by conveying to the flame at the tip of the burner a supply or feed of additional gas through the space between the burner-pillar and the surrounding tube or shell?

A. The effect of the operation of all of them is that a supplemental feed of gas is conveyed by the surrounding-tube to the tip of the burner.

Q. Is not this additional supply of gas in all of them furnished through perforations which allow the gas to escape from the stem or pillar of the burner, into the space between that and the surrounding tube or shell?

A. It is.

Q. Is not that supply in all of them increased or diminished by opening or covering such perforations, as the case may be?

A. The supply of all of them is increased or diminished to the extent that the perforations may be covered or uncovered, or to the extent that communication may be had between the interior and exterior of the burner-pillar.

Q. Is not that opening or covering of the perforations effected in all of them by means of screwing up or down the surrounding shell or tube?

A. It is not; in the burners A, B, D, and E the supply is effected by screwing up or down the surrounding-tube; in the burner C the supply is effected by screwing up or down the burner; there is no effect of increasing or diminishing the supply by screwing up or down the surrounding-tube in the burner C.

Q. Is it not effected in all of them by adjusting the female screw, moving it up or down upon the male screw?

A. In the case of the burners A, B, D, and E, it is effected by adjusting the female screw of the surrounding-tube up and down on

231 the male screw on the burner-pillar; in the burner C it is effected by adjusting the female screw of the burner up and down on the male screw on the tubular valve.

Q. Explain what you mean by an adjustable burner, as referred to in your examination-in-chief.

A. An adjustable burner is one that will so adjust as to furnish an increased or diminished supply of gas to the burner-tip, whether that increased or diminished supply is furnished through the pilar of the burner to the tip or by any external means.

Q. Are simple bat-wing burners more commonly used for coal-gas than adjustable burners?

A. In my opinion, there are nearly as many bat's-wing burners in use with some mode of adjustment for burning coal-gas as there are that have no mode of adjustment.

Q. Which are most used for burning gasoline or carbureted air, the simple bat-wing burners or adjustable burners?

A. In my opinion, there is a larger number of simple bat-wing burners used for burning carbureted air, having a suitable orifice, however, for said carbureted air, as previously described by me.

Q. Do you consider that both the drawings Nos. 1 and 2 in Solliday's patent are covered by the claim in his patent?

A. I do.

Q. Would burners made according to either drawing be covered and protected by the claim in that patent?

A. Provided the patent was in force, I think it would, so far as I am informed.

Q. Are not turning or swinging brackets more commonly used next to the walls in private houses than stationary brackets?

A. I do not think they are more commonly used; they may be used in greater numbers; the use of what are known as stiff brackets is very common indeed; swinging brackets are used with one or more
232 swings—perhaps a greater number with one swing rather than more; however, there are large numbers used with two swings, and sometimes those having three.

Q. With the swinging bracket is the flame always flatwise to the wall?

A. A double swing bracket can be so turned that the flame is not flatwise to the wall; when the burner is properly put on, however, the flame stands flatwise across the arm of the fixture, and therefore presents an appearance consistent with the appearance of the fixture.

Q. In your description of the construction and operation of a burner made according to defendants' patent, have you not confined yourself to and followed Exhibit C?

A. In my description of the construction of a burner made in accordance with Exhibit C, I have confined myself to the drawings and specifications in connection with Exhibit C.

Q. State what burner in use before Clough's patent embraced any of the elements of his invention, and what elements or parts were so embraced.

A. I consider the elements in Clough's burner consist of the bat-wing burner, with perforations in the burner pillar and a tube surrounding said burner, and a tubular valve; the Solliday burner, the Lunkenheimer burner, the Horace R. Barker burner, and the Coolidge burner, all embrace those elements; the Solliday burner having a surrounding-tube and an opening through the pillar below the top of the tube, when the tube is screwed up; in the Lunkenheimer burner a tubular valve, in the Coolidge burner a surrounding-tube, with a perforation at the base of the burner; in the Horace R. Barker burner a surrounding-tube, with perforations at the base of the burner, and a

tubular valve, the tubular valve being a part of the construction of said burner.

Q. Did they or not equally embrace elements or parts employed in the structure of your burner? And if you answer no, point out the difference.

233 A. I answer yes.

Q. Examine page 66, folio 168, of the printed case, and say whether February 25th, 1869, should not be February 25th, 1870.

A. No, it should not; that date was given in the testimony of Horace R. Barker, and referred to an application by him to the Patent Office for a patent, which date I believe to be correct.

Q. Are not the same elements or parts of the defendants' burner which you have said are found in Solliday's, the Horace R. Barker, and the Coolidge burners also and equally found in yours?

A. The same elements are found in complainant's burner as in those referred to; the arrangement of those elements is different, which constitutes a different device.

JOHN F. BARKER.

Subscribed and sworn to before this March 10th, 1875.

R. E. STILWELL,
Examiner, &c.

Adjourned to Wednesday, March 10th, at 1 o'clock a. m.

NEW YORK, *March 10th*, 1875.

Pursuant to adjournment.
Parties present.

ELLIOT P. GLEASON, sworn for complainant, testifies as follows:

Q. What is your name, occupation, residence; and do you know the parties in this suit, and how long have you known them?

A. My name is Elliot P. Gleason; my occupation, manufacturer of gas-burners; my residence, in Brooklyn, Kings County. I know the parties to this suit; have known the complainant for 9 or 10 years and the defendant probably 7 years.

234 Q. Where do you manufacture gas-burners?

A. In New York City, corner of Houston and Mercer.

Q. How extensively are you engaged in their manufacture?

A. We have the largest establishment of the kind in the country.

Q. Have you any idea of how many you make in a year?

A. It goes into the millions—three or four millions.

Q. How long have you been engaged in the business?

A. Nearly twenty years—nineteen and a half.

Q. To what extent are you practically acquainted with mechanics, and particularly with the practical part in the manufacture of gas-burners?

A. I have been a practical workman myself at the business, have employed a number of men, and am familiar with the different forms.

Q. You understand practically everything in relation to the manufacture of gas-burners?

A. Yes, sir.

Q. Are you acquainted with the different kinds of burners which have been used in this country for the last twenty years?

A. I am practically familiar with the burners that have been made for the last twenty years.

Q. Have you testified as a witness in patent cases; and, if so, to what extent?

A. I have; only two or three times, I guess.

Q. About what number of men have you in your employment?

A. We average about seventy hands.

Q. Are you familiar with the patent, and have you read the specifications and examined the drawings of the patent now shown you, Defendant's Exhibit, Clough's Patent, No. 1, and do you understand such specifications and drawings?

235 A. I am familiar with the patent and burner and have read the specifications, and I think I understand the specifications and the drawings and the construction of the burner.

Q. Please look at Exhibit John F. Barker's Patent E, Burner No. 4, and state if you understand the construction and operation of that burner.

A. Yes, sir; I understand its construction and operation.

Q. You are familiar with that class of burners?

A. Yes, sir.

Q. Please state whether, in your opinion, there is anything in the specification or drawings in Clough's patent just shown you from which a mechanic ordinarily skilled could construct that burner.

(Objected to as immaterial, irrelevant, and incompetent, the witness not having been sufficiently shown to be an expert.)

A. I see nothing in the Clough patent or specification, drawings and burner which describes the burner manufactured by Barker, the Barker patent, Exhibit E.

Q. Please state whether, in your opinion, assuming that a skillful mechanic knew and understood the specifications and drawings in Exhibit Defendant Clough's Patent No. 1, burners like Exhibit E could or could not be made by him without further invention.

(Same objection.)

A. In my opinion the burner E, manufactured by Barker, could not be made from the specifications and drawings of Clough's patent without further invention.

Q. Please state whether or not, in your opinion, burner Exhibit E is or is not a better burner than burners made in accordance with the specifications and drawings in Defendant Clough's Patent No. 1, and your reasons for any opinion you may give.

(Objected to as incompetent and immaterial.)

A. In my opinion the burner E is a better burner than the
236 burner made under Clough's patent, for the reason, first, that it is less expensive; it can be made for twenty-five per cent. less; it is just as effective in its operation, producing the light luminosity, and more desirable from the fact that it can be adjusted without changing the position of the flame, or in adjusting the supply of gas to the burner it does not change the position or revolve the flame in its operation.

Q. How important a matter do you consider the revolution of the flame in the adjustment of the burner?

A. I consider it very desirable as an article of commerce to be sold and introduced to have a burner that does not revolve the flame, in placing or setting the light to any particular angle, and to maintain that while it is in use.

Q. How desirable?

A. I think the Barker burner would supersede the other in its introduction in the market.

Q. In point of fact how is that; which of these burners is used more extensively?

A. The Barker burner is used more extensively than the Clough burner; in fact, in my opinion, the Clough burner has gone out of use entirely.

Q. Why is it desirable that the flame should not be made to revolve in adjusting the burner?

A. It is desirable in placing burners upon a fixture that they should be placed upon an angle with the light to get the best effect in the room to be illuminated; in the use of the Clough burner, in adjusting the outer tube to the supply of gas to get the desired light, you would have the angle sometimes one way, sometimes another; you cannot govern or cannot get a fixed angle in adjusting the burner.

Q. Please state whether or not the elements of the combination set forth in the claims in Exhibit Clough's Patent No. 1 were at the time of his invention new or old.

(Same objection.)

237 A. The elements in the Clough burner were not new at the time of his invention; they were well-known elements in common use.

Q. Please state whether a bat's-wing burner perforated at the base, in combination with a surrounding-tube, was new or old at the date of Mr. Clough's invention.

(Same objection.)

A. In my opinion it was old at the time.

Q. In what burners had that combination been used?

A. It was used in the Coolidge burner, and also in the Solliday.

Q. And also in the Horace R. Barker burners?

A. Yes; also in the Horace R. Barker burners.

Q. Please look at Exhibit A, Burner No. 2, being the burner made by Theodore Clough, and state whether or not, in your opinion, that burner is an infringement upon complainant's patent, and your reasons.

(Objected to as incompent.)

A. In my opinion it is an infringement of Barker's patent, burner E, from the fact that it is substantially the same thing, having a main burner, a bat's-wing burner, and a surrounding and revolving tube to revolve, to lower or raise it to adjust the supply of gas to the tip.

Cross-examined by defendant's counsel:

Q. Examine the John F. Barker burners, Exhibits D and E, and say whether the elements and component parts of that combination were not equally well known at the same time that you said the elements and parts of the Clough's patents were known and used.

A. I think their elements were all well known at that time.

Q. Are not the elements and parts entering into the combination of those burners the same as employed in making the Clough burner?

238 A. The Barker burner does not possess all the elements or all parts that the Clough burner does.

Q. In making that answer have you not had sole reference to Exhibit C, as a Clough burner?

A. Yes, I did have reference to the burner C, the burner patented and shown in the specifications and drawings.

Q. (By Mr. STANLEY.) C you understand to be a correct specimen of that?

A. Yes, sir.

Q. What part is it that Exhibit C contains which the Barker burner does not contain?

A. The burner C of the Clough burners contains a central tube, the office of which is to conduct the gas through the burner to the tip; the Barker burner does not contain that separate element or separate piece.

Q. Is not that the piece which you and others in the former trial of Clough against the Gilbert & Barker Manufacturing Company called the tubular valve?

A. It is so called, a tubular valve, I believe; it is so understood and known as a tubular valve.

Q. Without that, or in the absence of that, are not the parts and elements of the two burners—I mean the Barker and Clough burner—the same? I do not refer now to the exact form of construction, but to the elements and parts used in the device of each.

A. It contains the same number of pieces; the same parts, but inoperative.

Q. You mean by that, that if you took *out* the tubular valve out of burner C, that then it would not operate?

A. It would not operate; it is essentially one piece.

Q. But would you not say that A and B contained the same parts and elements that D and E do?

A. Yes; they are alike practically in construction.

GEORGE H. KITCHEN, sworn for defendant, testifies as follows:

239 Q. Do you know the parties to this suit, The Gilbert & Barker Manufacturing Company, complainant, vs. Theodore Clough?

A. Yes, sir.

Q. State your residence, occupation, and how long you have been engaged in that occupation.

A. My residence is New York; my occupation, the gas-fitting and fixture business; I have been engaged in that business for thirty years.

Q. Does your business embrace manufacturing and selling gas-burners?

A. We sell gas-burners.

Q. Are you acquainted with the different forms of gas-burners in use?

A. I am, with most of the burners in use.

Q. Have you been so engaged since you have been in the business you have described?

A. I have.

Q. Your business requires you to buy from manufacturers and sell to your customers large numbers of gas-burners?

A. Yes, sir.

Q. And do you fit them to your machines—adjust them?

A. We do.

Q. By that means have you become familiar with their construction, their use and operation?

A. Very generally.

Q. Have you seen the specifications and drawings in the John F. Barber patent of July 26, 1870; have you examined them, and do you understand them?

A. No, I have not examined the patent; I have examined the burners, and understand them.

Q. Did you ever examine the specifications and drawings in the patent itself?

A. I don't say that I have made a special study of them; I have looked at them.

Q. Have you seen and examined the specifications and drawings in the patent issued to the defendant Theodore Clough, of the 14th June, 1870?

240 A. I have.

Q. Examine Exhibits D and E, John F. Barker burners, and say whether, in your opinion, they are in their construction and mode of operation substantially the same as the burners described in the drawings and specifications of Clough's patent; whether or not, in your opinion, those burners are an infringement of Clough's patent.

A. The burner is essentially the same as Mr. Clough's, and, in my opinion, is an infringement upon his patent.

Q. Examine the burner Exhibit B and the burner now shown you and say whether they are the same in their construction and mode of operation.

A. They are precisely the same, sir.

(The one shown witness offered in evidence, marked Clough, F.)

Q. When and where did you first see the one just shown you and now marked Clough, F?

A. I saw that burner at my place of business, 591 Broadway, in December of '69 or January of 1870.

Q. Who showed it to you?

A. Mr. Clough.

Q. The defendant in this suit?

A. Yes, sir.

Cross-examined by complainant's counsel:

Q. What experience, if any, have you had in testifying in patent causes?

A. My experience has been very limited; I think this is the second case.

Q. Was the other one the case in which these same parties were parties?

A. I call this the same case; in one other case.

Q. What case was that?

A. It was a case of an infringement in patent illuminated signs.

241 Q. Are you a practical mechanic, or have you been at any time?

A. Yes, sir.

Q. In what line?

A. In metal-working.

Q. For what manufacture?

A. Of late, these gas-fixtures chiefly.

Q. Did you work at the trade yourself?

A. I served an apprenticeship of nearly seven years to the business.

Q. I understand you, that did not include the manufacture of gas-burners?

A. Not to any extent; I have made gas-burners, but I don't consider myself a burner-maker.

Q. Where has the burner Exhibit F been since the time it was received by you from Mr. Clough?

A. I cannot tell you, sir; I don't know.

Q. After you received it, what did you do with it?

A. It has not been in my possession, sir.

Q. It has not been?

A. No, sir.
Q. What did you do with it after you first saw it?
A. It was simply shown me by Mr. Clough; I never had possession of it.
Q. And taken away by him?
A. I presume so; yes.
Q. I suppose, of course, that you are not able to identify that as the identical burner that was shown you?
A. Only so far as it is the same article; I could not identify that particular burner.
Q. In what way do you fix the date at which it was shown you?
A. From the date of his application for his patent.
Q. Do you know what that date was?
A. That, I think, was the 4th December, 1869.
Q. How do you know it was at that time?
A. Because at that time I was very intimate with Mr. Clough; he was at my place nearly all the time.
242 Q. What was he doing at your place?
A. He was experimenting with burners.
Q. Where was your place?
A. 591 Broadway.
Q. Where was Mr. Clough living at that time?
A. I think at that time he lived at Dobbs Ferry.
Q. Do you know whether he did or not?
A. I think he did, but I would not be positive.
Q. About that time did you see Mr. Clough's application for his patent or his specifications for his patent?
A. I cannot state positively; my impression is that I did.
Q. The burner that you saw did you understand to be made in accordance with those specifications?
A. Yes.
Q. What was your reason for testifying this morning that this Exhibit F is the burner which Mr. Clough showed you at that time in 1869 or 1870?
A. It is the same kind of burner that he showed me, precisely the same.
Q. Since 1869 or 1870, until this morning, had you seen this burner before?
A. I may have seen it, but I have no recollection now.
Q. Won't you look at Exhibit C, and state whether or not that is a burner which is made in accordance with the specifications in Mr. Clough's patent?
A. I think it is, sir.
Q. Did you see a burner like that about 1869 or 1870?
A. Yes, sir.
Q. That Mr. Clough showed you?
A. Yes, sir.
Q. May it not have been a burner like this instead of a burner like Exhibit F, which he showed you at that time?
A. No, sir; I am positive about the burner arranged as that one is—Exhibit F.
243 Q. Did he show them both to you at the same time, the one like Exhibit C, and the one like Exhibit F?
A. No, sir.
Q. Which did he show you first?

A. I had seen the one marked C some time before the other was made.

Q. Who was present when the burner like Exhibit F was shown to you, if any one?

A. There was probably a number, but I cannot mention any one.

Q. When did Mr. Clough begin to manufacture, as far as you know, burners like Exhibit A for sale—if you know?

A. I do not recollect; it was in the early part of the year 1870.

Q. I think Mr. Clough says, late in the year 1870; you have not any definite recollection?

A. I have not a definite recollection, although I think it was shortly after his application for his patent—not many months after that.

Q. Was it very shortly after Exhibit F was shown to you that burners like Exhibit A were manufactured for sale by Mr. Clough, to the best of your recollection?

A. His burners were made and for sale before his patent was obtained.

Q. You recollect that there were some burners made and for sale?

A. They were made and for sale before his patent was obtained.

Q. Those were like Exhibit C, were they not, or were they like Exhibit A?

A. I think they were like Exhibit C.

Q. Were burners like Exhibit A made by Mr. Clough, and offered for sale, soon after you saw Exhibit F?

A. I think they were, sir.

Q. You have no way, have you, of fixing the precise time at which Exhibit F was shown to you?

244 A. I cannot fix it exactly, sir.

Q. Do you not consider Exhibit F as a better burner than Exhibit C?

A. I consider it a better burner, inasmuch as it can be produced cheaper only.

Q. Are burners like Exhibit C for sale now, as far as you know, in New York?

A. I don't think they are, sir.

Q. They have gone out of use, have they not?

A. I cannot answer that, although I am not using them myself.

Q. You don't know of their being used?

A. I don't know of their being used.

Q. Since this burner, Exhibit F, was shown you, when was your attention first called to its having been shown you, and by whom?

A. It was shown to me to-day by Mr. Clough.

Redirect:

Q. Did you or not see the burner Exhibit Clough, F, or a burner like it, before the issue of the patent to Clough in June, 1870?

A. I did sir.

Recross:

Q. How do you know that it was before the issue of the patent?

A. I know from some conversation that took place at the time the burner was made.

Q. What was that conversation?

A. I made a remark to Mr. Clough that it was a pity he had not perfected this burner before making the application for his patent—the patent that was then pending.

Q. What did he say to that?

A. I cannot give you his exact words, but his answer was that the patent for the other fully covered this; this was a simpler and cheaper form of making it.

Q. Your suggestion then was that possibly the patent might not cover this burner?

245 A. No, I had not a thought of that kind, but thought it would have been as well for him to have perfected the burner.

Q. I understood you to say before that the burner which Mr. Clough did show to you was one that was made in accordance with the specifications in his patent; did you mean to state?

A. Yes, sir.

GEO. H. KITCHEN.

Subscribed and sworn to before me, this 11th March, 1875.

R. E. STILLWELL,
Examiner, &c.

THEODORE CLOUGH recalled, and examination resumed by defendants' counsel:

Q. Examine the burner marked Exhibit Clough, F, which is this day put in, and say who made it.

A. That burner was made by my own hands, from stem to stern.

Q. When?

A. Well, it was made in Dobbs Ferry in 1869.

Q. Did you ever show a burner like that, or that same burner, to anybody before the issue of your patent?

A. Yes, sir.

Q. Was it that particular burner, or one just like it?

A. Well, I can't say it was this particular burner; there were some four or five of them made, and I showed them to the women folks, what I swore to in my testimony before, and they disapproved of them on account of the size.

Q. Afterwards to whom did you show it, and when?

A. I showed it to Mr. Kitchen.

Q. The witness who has just testified?

A. Yes, sir.

Q. When, as near as you can?

A. Well, I should say it was in January or February.

Q. You mean January or February of 1870?

A. Yes, sir.

246 Q. Examine Exhibit Letter C and the drawings and specifications of your patent, and say whether you consider what has been called the chamber and shoulder of any consequence or of advantage in the structure of that burner.

A. I do not think that the drawings show anything about the shoulders; at any rate I never meant to claim anything about the butting up against the shoulder that was got in there; I don't think the specification said anything about it; it was supposed that that cylinder would fit tight enough inside to prevent any escape of gas through the perforations without butting against the shoulder; I don't think that is worth hardly speaking about; I never considered it of any moment when I made the burner.

Q. You don't then consider it as any material part of your invention, or of the specifications and claims in your patent?

A. No, sir.

Q. What is the relative cost of manufacture of your burners and the John F. Barker burners?

A. I should say that there was a difference of at least sixty or seventy-five per cent.; the burners that I make now.

Q. By that you mean the burners that you are making under your patent of 1871?

A. Yes, sir; which is not involved in the first patent, only a change in form.

Q. And of the burners put in this suit as exhibits as being made under your patent of 1870, and John F. Barker's patent of 1870, what is the relative cost?

A. I should say one could be made about as cheap as the other.

Q. Mr. Barker, in his testimony, in describing the structure, mode of operation, and effect of your burner, has said, "The effect of this supplemental feed is precisely as though the flames of two ordinary bat-wing burners, which had a different slit, were brought together on an angle of forty-five degrees; in such case the connection of the two
247 flames would cause the one flame to be much thicker and more than double the light could be obtained from the one flame than was obtained from the two with the same consumption of gas;" do you consider that such is the effect and operation of your burners?

A. No, certainly not; the effect is entirely different; I mean to say by effect—it may effect the same result, but the mode of working the thing is entirely different—both of those slots are coming out under the same pressure.

Cross-examined by complainant's counsel:

Q. Where has Exhibit F been since you made it?

A. It has been with you all the time, I believe; it was on the trial?

Q. You mean that identical burner?

A. Why, certainly that identical burner.

Q. You don't mean that it has been with me?

A. Well, the burner has been with Mr. Yeaman.

Q. You think you got it from him, from his package of burners?

A. Yes, sir; there has been none of these burners manufactured since the time that this suit was commenced.

Q. Where was it prior to the time that you brought it to Mr. Yeaman?

A. Well it was at my house; I made it up at Dobbs Ferry.

Q. Well, did you bring it from your house at Dobbs Ferry to Mr. Yeaman?

A. Yes, sir; I also showed it to Mr. Kitchen.

Q. It has never been in use anywhere; it was made as a sample?

A. Made as a sample; yes, sir.

Q. Was the only objection of the women to whom you say you showed it, or one like it, that it was too small?

A. Too small; that is all, yes, sir; if you notice, they are small in the centre.

Q. Why didn't you make it larger after that?

248 A. At that time I was all engrossed in getting my patent and trying to encourage Mr. Barker to take hold of it and make a business of it with me—to take the agency of it; that is one reason.

Q. Do you mean to say that you had any communication with Mr. Barker personally?

A. Not with Mr. Barker personally, because I did not know the man at that time.

Q. Was it before or after you made your application for the patent that you made Exhibit F, and those which you made like Exhibit F?

A. I stated I made some burners in the first lot of burners, and then I made that; it was before the issuing of the patent that that burner was made; I think about the time I made it and others—I think it was about December when the application was filed—I should say it was along about December or January that I made that sample, up in the country.

Q. After you had made your application for the patent?

A. Yes, sir.

Q. Why didn't you have your specifications amended before the patent was issued, so as to include this?

A. I don't think it was possible to withdraw the specifications without applying right over anew; you might better have a reissue; I believe that is generally the way they do it—have a reissue.

Q. Was that your reason for not having it amended?

A. Yes, sir.

Q. When you speak of the comparative cost of Mr. Barker's burner and of your burners, do you mean by your burners, burners made like Exhibit C?

A. Yes, sir.

Q. Same pattern as Exhibit C?

A. The same pattern; yes, sir.

Q. Do you mean to say that your idea is that those like Exhibit C can be made as cheaply as those like Exhibit E?

249 A. Yes, about the same; I sold those burners for fifty cents apiece; I believe Mr. Barker charges fifty cents apiece for his.

Q. You have sold burners like Exhibit C for fifty cents apiece?

A. Yes; Mr. Barker sells his for fifty cents apiece; that was the price for Mr. Barker's burner; the difference in the labor, in the burner I made—in that C—I don't think there is much difference in that when it comes right down to cost.

Q. Why did you not continue to make burners like Exhibit C instead of making them as you afterwards made them, like Exhibit E?

A. There was no trade for anything of that kind then, when I made those burners; I wanted to get some concern that was doing some kind of substantial gas business, like the Gilbert & Barker Manufacturing Company, that would acquiesce in the thing and try to help me along with it.

Q. But you did cease to make burners like Exhibit C, and did make them subsequently like Exhibit E?

A. Yes, sir.

Q. Why did you make that change?

A. Because it was the easiest to command.

Q. Why was it the easiest to command?

A. Because one was made of cast-iron, and the outside shell was made out of brass; the iron was cheaper than the brass; certainly, the biggest half of the burner was made out of iron.

Q. Exhibit A is a burner that you made yourself?

A. Yes, sir.

Q. And Exhibit C is the one that is described in your specifications?

A. Yes, sir.

Q. Now, why did you cease to make Exhibit C, and proceed in the fall of 1870 to make Exhibit A, if one was just as cheap as the other?

A. One is half cast-iron; the cast-iron is worth about six cents

250 a pound, and brass is worth fifty cents; now, I ceased to manufacture them because I could make half of it out of cast-iron.

Q. And therefore it would be cheaper.

A. A great deal cheaper; yes, sir.

Q. Then burners like Exhibit A are cheaper to manufacture than burners like Exhibit C; are they not?

A. If they are made half out of cast-iron; yes, sir.

Q. What is the difference in the cost of burners Exhibit C and A?

A. There is the difference of the price of the metal; there is about 7 or 8 to the pound, at fifty cents; the other is fifty cents all round.

Q. What is the difference in the cost?

A. Mr. Barker makes his wholly out of brass castings; I can't tell what the castings would cost, I am sure; I never had any in the rough.

Q. Give us some idea of the comparative cost?

A. Well, I should say there would be a difference of probably five cents a burner; another thing, iron works a great deal easier than the brass; that kind of burner iron—that special kind of iron.

Q. Please state whether, as far as workmanship is concerned, it is not substantially as much work to make Exhibit C, leaving out the tubular valve, as to make Exhibit E?

A. I should say it was.

Q. Do you consider your patent Exhibit Clough No. 2 a valid patent?

A. I only consider that just a reissue, that is all; only a difference in form, that is all; I should have applied for the reissue of the old patent, but the patent lawyer told me, says he, "Clough, you had better by all means apply for a new patent; it will just cost about the same money, and you gain a year in time."

Q. Did you surrender your old patent when you claimed that?

A. No, certainly not; why should I. That was simply a reissue of that patent; there is nothing claimed in that that ain't claimed in the first patent—not at all.

251 Q. Then, if your new burner is covered by your original patent, what was your object in taking out your new patent?

A. Simply a change of form, that is all.

Q. What more did you get by your new patent than you had already; what additional right do you consider yourself to have in your new patent than what you had in your old patent?

A. I don't know as I got anything—only gained about a year's time in the life of the patent; that is all.

Q. Does the flame of burner C revolve when that burner is regulated?

A. Yes.

Q. Does it in your burner B?

A. No, sir.

Q. Anything said about that matter in the specifications in your patent?

A. No, sir; I don't think that was called in question. I didn't think it was of any moment.

Q. I don't understand you to say that you consider that the particular mechanical device of the burner B is set forth in your specification, do I?

A. I think it is; I think it is fully described. There is the surrounding-tube with the burner perforated at the base; that is about all that I ever considered was patentable; the device there shutting off the gas from the surrounding-tube can be made in any form. I believe the

patent says that a man may have any kind of a shut-off that he has a mind to. There is a tubular valve all round; I don't see how you can make anything but a tubular valve out of that.

Redirect:

Q. You mean on letter B?

A. Yes; on the whole of them.

Q. Is or not the burner Exhibit Clough, F one of the burners which you brought to me in your consultations with me in the prepara-

252 tion of your original bill in the said suit of yourself against John F. Barker and others?

Q. Yes, sir.

Q. And, so far as you know, it has been in my possession since then until you got it a few days ago from me, and showed it to Mr. Kitchen yesterday?

A. Yes, sir; I believe I borrowed the burner from you.

Q. And when you answered Mr. Stanley that it had been in their possession all the time, you only meant it had been connected with this suit all the time?

A. That is it.

Q. It had been in your possession since you made it up to the time of your showing it to me, during the preparation of your original bill against John F. Barker and others?

A. Yes, sir.

THEO. CLOUGH.

Subscribed and sworn to before me this 11th March, 1875.

R. E. STILWELL,
Examiner, &c.

253 At a stated term of the circuit court of the United States of America for the southern district of New York, in the second circuit, held at the United States court rooms in the city of New York, on Wednesday, the 15th day of May, in the year of our Lord one thousand eight hundred and seventy-eight.

Present, the honorable Samuel Blatchford, circuit judge.

THEODORE CLOUGH
vs.
THE GILBERT AND BARKER MANUFACTURING Company.

The above cause coming on for final hearing, Mr. George H. Yeaman is heard on behalf of complainant.

Mr. William Stanley is heard on behalf of defendant.

Cur adv. vult.

254 Circuit court of the United States for the southern district of New York.

THEODORE CLOUGH
vs.
THE GILBERT & BARKER MANUFACTURING Company and others.

BLATCHFORD, J:

This suit is founded on letters patent granted to the plaintiff June

14th, 1870, for an "improvement in gas-burners." The specification says: "My invention relates more particularly to burners for burning illuminating gas made by saturating air with vapor of gasoline, commonly called air-gas. It has been found that common bat-wing or fish-tail burners are not adapted to burning this gas as ordinarily made, owing to the variable density of the gas coming from the generating apparatus. The object of my improvement is to adapt the slitted or bat-wing burner to the burning of air-gas. Said improvements consist, first, in perforating the base of the burner-tube with small
255 holes or passages for gas to escape at the base of the burner and surrounding the burner with a tube open at the top but closed at the bottom and united to the burner below the perforations in the burner-tube; it is more convenient to screw the tube to the burner, but it may be attached in any suitable manner; second, in regulating the escape of the gas from the perforations at the base of the burner by a sliding tubular valve or cut-off, introduced into the burner-tube at the base and extending upward within it, the position of the tubular valve being regulated by a screw. These improvements, by furnishing a regulated supply of gas outside of the burner, but directed to the tip of the burner by the surrounding-tube, give steadiness and increased illuminating power to the flame of the bat-wing burner and make it a desirable burner for burning air-gas. The drawings represent a bat-wing burner as improved by me.

256 "Figure 1 represents an elevation of my improved burner attached to a short piece of gas-pipe.

"Figure 2, a view showing the surrounding tube in section and the burner therein.

"Figure 3, a vertical section through the burner and tube.

"Figure 4, a transverse section through the base of the burner-tube. Letter *a* represents the burner-tip; *b*, the burner-tube; *c*, perforations at the base of burner-tube; *d*, the surrounding-tube screwed to base of burner-tube; *e*, the tubular valve extending up in the burner-tube, and operated by an annular screw, *f*, attached to the lower end. Said annular screw, besides having a screw to work in the base of the burner, has an internal screw by which it and the burner is attached to the gas-pipe, as clearly shown in Fig. 3 and the other drawings, the gas-way being through the annular screw and tubular valve to the burner. As the burner is connected to the gas-pipe, *g*, by means
257 of the annular screw, the adjustment of the gas escaping through the perforations of the burner-tube is easily made by turning the burner upon the annular screw. I claim as my invention and improvement in air-gas burners, the bat-wing burner perforated at the base in combination with the surrounding-tube, substantially as described; also, in combination with the bat-wing burner, perforated at the base and surrounding-tube, the tubular valve for regulating the supply of external gas to the burner, substantially as described."

The defendants, in their answer, set up that they have not infringed the patent, and that it is void for want of novelty. At the request of both parties the court ordered a trial at law, in this court, of two questions:

"First. Whether or not the complainant is the first and original inventor of the improvement in gas-burners for which the first above-named patent has been granted to him.

258 "Second. Whether or not the gas-burners manufactured by the defendants are substantially identical with those described in

the complainant's patent and schedule thereto annexed, in their construction and mode of operation."

The issues were tried before Judge Shipman and a jury, and the jury answered bot' of the questions in the affirmative.

Afterwards, on a case made, the defendants moved before Judge Shipman for a new trial, on the ground that the verdict was against the weight of the evidence. He denied the motion in a written opinion, in which he stated that the weight of the evidence on the question of infringement was not such as to justify him in granting *him in granting* a new trial, and that he was satisfied with the conclusion of the jury on the question of priority.

He afterwards signed and filed a certificate that in his opinion the verdict on both questions was sustained by the evidence given.

The burners made by the defendants were made in accordance
259 with the description of the first form of burner described in the specification of letters patent granted to John F. Barker, one of the defendants, July 26th, 1870, for an "improvement in gas-burners." The drawings of that patent consist of ten figures, which are thus referred to in the specification: "Figure 1 is a side view of one modification of my invention; Figure 2 is a side view of the shell; Figure 3 is a side view of the burner; Figure 4 is a vertical longitudinal section of the shell, through line A B of Fig. 2; Figure 5 is a vertical longitudinal section of the burner through line C D of Fig. 3; Figure 6 is a side view of another modification of my invention; Figure 7 is a side view of the shell; Figure 8 is a side view of the burner; Figure 9 is a vertical longitudinal section of the shell through line E F of Fig. 7, and Figure 10 is a vertical section through line G H of Fig. 8." The specification goes on to say: "My invention relates to a device for regulating the flow of carburetted air or gas from the burner to its point
260 of combustion, and it consists of a burner having a screw-thread made upon its lower part, upon which is fitted, to turn freely thereon, a shell or tube; also having a screw-thread upon its interior lower part, and the bore of said tube or shell is somewhat larger in diameter than the diameter of the upper part of the burner upon which it turns. A series of perforations is made in the lower part of the burner, so that, when the burner is made or set for the combustion of carburetted air or gas of any certain quality, the flame may be increased or diminished by turning the shell either up or down, as the case may be, the shell, in its movements up or down, either closing or opening the holes or perforations, and letting out or stopping the flow of the gas through the said holes, as it is moved up or down. In the use of carburetted air for illuminating purposes it is almost always the case that, when the gasoline is first placed within the generator, it gives off a much greater amount of vapor, and the air, in passing
261 through the generator, absorbs a greater amount of the carbon, and consequently becomes more thoroughly charged with, and is much richer in the illuminating qualities of the gasoline than when the generator has been charged for a greater length of time, and as a result the carburetted air is sometimes too rich to make a desirable light, with the same amount passing out of the burner, and at other times, as when the generator has been charged a longer time, the carburetted air flowing through the burner is deficient in illuminating power, and the light or flame produced is not uniform in its power or steadiness, and is sometimes liable to produce a smell or smoke when too rich in carbon. My invention is designed to obviate all difficulty in this respect, as the burner is set or made to let out at the tip the minimum quantity of

gas that will produce a good flame, and, as the gasoline remains longer in the generator and becomes weaker in its illuminating qualities, the
262 outer tube or shell may be turned so as to let out more gas and increase the flame without liability to smoke. That others skilled in the art may be enabled to make and use my invention, I will now proceed to describe its construction and mode of operation: In the drawing L represents the main part of the burner, which is made similar to the common burner, except that the lower part has a screw-thread made upon the outside and inside. Figs. 1, 2, 3, 4, and 5, represent one modification in which L is the burner, having the usual screw-thread made upon the lower interior part by which to secure it to the pipe. At *a* is a conical shoulder or seat upon the exterior shown in Figs. 3 and 5, and a screw-thread *d* made upon the exterior of the lower end, and the small holes *c* are made either at the seat *a* or just below it. I is a shell or tube, the inside diameter of its upper part being somewhat greater than the outside diameter of the part L, and upon the exterior of the
263 tube at *a* is a conical shaped seat made to fit upon the interior seat *a'* upon the burner L. A screw-thread, *d*, is made upon the interior of the lower part of the tube I, which fits the thread *d'* upon the exterior of the burner L. The operation of this modification is as follows:

"When the tube I is turned entirely on to the burner L, the inner seat *a* fits down upon the shoulder *a'* of the burner L, and the only place of egress for the gas is through the slot at the tip. When the gasoline is fresh or new this slot will be quite sufficient to supply the flame, but as the gasoline becomes more exhausted of carbon, the tube or shell I may be turned up a little so that the seat *a* shall be raised slightly from the shoulder *a'*, and more or less of the gas will pass out through the holes *c* and pass up between the tube I and the burner L as the tube I is turned up or down, and when the gas which escapes through the holes *c* and passes up between the tube and burner, reaches the
264 top, it unites with that passing out of the slot at the tip increasing the volume and flame. In this device the gas, after passing out through the holes *c*, is prevented from passing down between the tube and burner by the screw-threads *d* and *d* upon the inside of the tube and outside of the burner. In the modification shown in Figs. 6, 7, 8, 9, and 10, both the burners and regulating tube are similar to that already described, except that the thread *d'* upon the outside of the burner L is carried up higher, and the holes *c* are made below the top of the outer thread but above the top of the inside thread. The thread upon the inside of the tube I is not so long as the outside thread upon the burner L, but is considerably less, so that when the tube I is turned entirely down on the burner the holes will be above the thread on the inside of the tube; and there is no inside seat in the tube I to operate upon a bevelled or conical exterior shoulder upon the burner
265 L as in the other modification. The operation of this modification is as follows:

"If the flame be too weak the tube I is turned down upon the burner L until the top of the inside thread of the tube begins to pass below the holes *c*, when the gas will escape and pass up between the tube and burner and increase the flame as before. If it should be desirable to stop the escape of gas through the holes *c*, it is only necessary to turn up the tube upon the burner and when the thread inside the tube covers the holes *c*, then there will be no escape of gas. It will be seen that the principles of the operation of both modifications are very much alike and are intended to accomplish the same object, although the tube

turns up in the first case to let out more gas while it turns down in the second case, both being equivalent, however, in their operation and accomplishing the same result. I am aware that gas-burners have been heretofore made to give an additional supply of gas to the flame,
266 but in those that I have seen they consisted of more pieces and were considerably more expensive to manufacture, and in their operation the burner revolved with the tube, thus causing the flame to revolve also. This is very objectionable as it is often desirable to have the flame stand in one particular direction. In this device the flame does not turn in the least, while the whole burner may consist of only two pieces, and is cheaply made and its operation and effect are perfect." The claim of that patent is, "An improved gas-burner, consisting of the burner or pillar L having holes *c c* therein, and provided with the movable or adjutable shell or tube I, all constructed and operating substantially as and for the purposes herein described and specified."

After such certificate was signed and filed by Judge Shipman, the Gilbert and Barker Manufacturing Company, defendants in this suit, brought a suit in equity in this court, as owners of the said pat-
267 ent granted to John F. Barker, for the infringement of the same, against Clough, the plaintiff in this suit, alleging as the infringment the making and selling of burners constructed exactly like the two forms described in the patent to Barker. The only testimony taken directly in the present suit brought by Clough is that taken on the trial before the jury and embodied in a case made, on which the motion for a new trial was made.

It is stated in the brief in this case on the part of the defendants that this case is brought to a hearing on the proofs and the verdict in such jury trial, and on the proofs taken in the suit against Clough, and that such latter proofs are by stipulation used on this hearing (I am not furnished with any such stipulation, but I assume that both parties understand that there is one, verbal or written). In the record in the suit brought against Clough I find the following entry: "It is agreed by the counsel that upon the trial of this cause either
268 party may read such parts of the testimony as he wishes given in the suit of Theodore Clough against The Gilbert and Barker Manufacturing Company, and contained in the printed case and exceptions in that suit, as evidence herein, subject to the same objections taken on the trial at law in that suit; and that, if the court will consent, the two causes may be tried together, when the case of Clough against the said company, or any motion for final decree therein, is reached and heard. This stipulation is without prejudice to the right of either party to take further testimony in this cause."

The stipulation contained in such entry is not a stipulation for the use on this hearing of any proofs taken in this suit brought against Clough, but I shall assume that all such proofs are to be regarded as used and read in this hearing, and from the brief of the counsel for Clough in the two suits I infer such to be his view.

The first claim of the Clough patent relates to the first of the
269 two improvements set forth in the specification; and the second claim relates to the second of such improvements. The combination of the perforated burner with the surrounding-tube, irrespective of any method of regulating the escape of the gas from the perforations, is the subject of the first improvement and of the first claim. The office of that combination is, as the specification states, to enable the surrounding-tube to direct to the tip of the burner the gas which comes

through the perforations, such tube being open at the top and closed at the bottom, and united to the burner below the perforations. The combination of the regulating-valve with the perforated burner and the surrounding-tube is the subject of the second improvement and of the second claim. Moreover, if the means of regulation are to be regarded as entering as an element into the first claim, there is no difference between the two claims.

270 The two forms of burner, A and B, alleged to be infringements in this case, are both of them substantially like the first form of burner described in the patent of Barker. In both of them the outside tube turns up to let out more gas. It is very clear that each of these burners contains the combination claimed in the first claim of the Clough patent. It is a more serious question whether either of these two burners contains the combination claimed in the second claim of the Clough patent.

They have no sliding tubular valve of cut-off introduced into the burner-tube at the base and extending upward within it. In them the tubular valve forms part of the surrounding-tube. Such valve goes to or leaves its seat by screwing up or down the surrounding-tube. The surrounding-tube cannot be permanently attached to the burner, but must be capable of movement, as it carries the valve. In the arrangement shown in the Clough patent the surrounding-tube may be permanently attached to the burner, because the tubular valve

271 is not carried by the surrounding-tube, but is a third and separate instrument carried by an adjustable cylinder inserted within the burner from below. Moreover, in the arrangement shown in the Clough patent the burner and surrounding-tube revolve together in adjusting their position in reference to that of the tubular valve, so as to let in or turn off the supply of gas through the perforations in the base of the burner, and by the revolution of the burner the flame also revolves. In the burners A and B the revolution of the surrounding-tube regulates the supply of gas through such perforations, and the burner never revolves, nor does the flame.

The combination covered by the first claim of the plaintiff's patent is, I think, found in the Horace B. Barker burners, the existence of which prior to the plaintiff's invention is satisfactorily proved. In those burners the burner was a bat-wing burner perforated at the base.

The perforations did not consist of small holes, but the stem of

272 the burner was slitted all the way down to the base, allowing the gas to escape through the whole length of the slit. There was a surrounding-tube united to the burner below the lower end of the slit. The burner-stem had a cone near its top, and when the surrounding-tube was screwed so as to be in a certain position with reference to such cone, the effect was to direct to the tip of the burner the supply of gas coming through the slit below, the surrounding-tube being open at the top and closed at the bottom, and the flame was thickened, and a ring of flame was formed.

The structure and mode of operation of the combination were the same as those of the combination covered by the first claim of the plaintiff's patent. The fact that the perforations in the Horace R. Barker burner existed not only at the base, but were continued in the form of a slit all the way up, makes no difference. Nor does it make any difference that the Horace R. Barker burner had a cone

273 near its top. The first claim of the plaintiff's patent is broad enough to cover the Horace R. Barker burner, and that claim must be held to be invalid for want of novelty.

In respect to the second claim of the plaintiff's patent, it is shown that in the Horace R. Barker burner the screwing down of the surrounding-tube so that it infringed against the cone near the top of the burner cut off the supply of gas which came through the slit below, and that the raising of the tube so that it did not bear against the cone allowed a supply of gas to come from below. Thus there was regulation and by a valve arrangement. In view of the existence of that burner, which contained the combination of a bat-wing burner perforated tube in substance like that of the plaintiff's patent, and a tubular valve for regulating the supply of external gas to the burner, the construction of the second claim of the plaintiff's patent must be such as to limit that claim to the form of tubular valve which he
274 describes, namely, one in the interior of the burner-tube and not forming part of the surrounding-tube. Under this construction the second claim of the plaintiff's patent is not infringed by the burner A and B, nor by any burner constructed in accordance with any description of a burner in the John F. Barker patent. I have come to the foregoing conclusion after a careful examination of all the evidence given in this suit and in the suit brought against Clough, and of the exhibits introduced, and with reluctance, because of the issue of the jury trial and of the expressed views of the judge who presided at it. But being satisfied that the law and the evidence require a decree contrary to the verdict of the jury trial, I am authorized and bound to pronounce such decree.

The bill is dismissed with costs.

George H. Yeaman, for the plaintiff.
William Stanley, for the defendants.

275 (Indorsed:) Circuit court of the United States for the southern district of New York. Theodore Clough vs. The Gilbert & Barker Manufacturing Company & others. Decision, Oct'r 14, 1878. Filed Oct. 14, 1878.

276 U. S. circuit court.

THEODORE CLOUGH
vs.
THE GILBERT & BARKER MANUFACTURING Company, John F. Barker, and Charles N. Gilbert. } In equity.

GENT.: You will please take notice that the proposed decree, hereunto annexed, will be presented for settlement to the Hon. Samuel Blatchford, at the U. S. court-rooms, in the city of New York, on the 3d day of January, 1879, at 11 o'clock a. m., or as soon thereafter as counsel can be heard. Dated N. Y., Dec. 20, 1878.

STANLEY, BROWN & CLARKE,
Att'ys, &c., 195 *Broadway.*

To GEO. H. YEAMAN, Esq.,
Solicitor for Pl'ff.

277 At a stated term of the circuit court of the United States for the southern district of New York, held at the court-house and post-office building, in the city of New York, on the fourth day of January, 1879.

Present, Hon Samuel Blatchford, circuit judge.

THEODORE CLOUGH
vs.
THE GILBERT & BARKER MANUFACTURING Company, John F. Barker, & Charles N. Gilbert. } In equity.

This cause came on to be further heard at this term of the said court and was argued by counsel, and thereupon upon consideration thereof it was ordered, adjudged, and decreed as follows, viz:

278 That the complainant's bill of complaint be, and the same hereby is, dismissed, and it is further ordered, adjudged, and decreed, that The Gilbert & Barker Manufacturing Company, John F. Barker, and Charles N. Gilbert, the defendants, recover of Theodore Clough, the plaintiff, the sum of three hundred and fifty $\frac{90}{100}$ dollars, their taxed costs herein, and that they have execution therefor.

Whereupon said complainant by his solicitors prays an appeal to the Supreme Court of the United States, which is allowed and the penalty of the bond to be given on said appeal is fixed at $1,000.

SAM'L BLATCHFORD.

(Endorsed:) In equity. U. S. circuit court, southern dist. of
279 N. Y. Theodore Clough, plaintiff, against The Gilbert and Barker Manufacturing Co. et al., defendants. Final decree. Stanley, Brown & Clarke, att'ys for def'ts, 195 Broadway, N. Y.

Due service of a copy of the within proposed decree and notice of settlement thereof is hereby admitted. N. Y., Dec. 23d, 1878.

GEO. H. YEAMAN,
Sol. for Compl'nt.

280 Circuit court of the United States for the southern district of New York.

THEODORE CLOUGH
against
THE GILBERT & BARKER MANUFACTURING Company & others.

It is hereby consented that Roger H. Lyon, esq., be substituted as the solicitor, &c., for the complainant in the above-entitled cause in our place and stead, and that an order of said court may be so entered therein.

Dated, New York, December 24, 1878.

YEAMAN & HALL,
By GEO. H. YEAMAN,
Sol's for Compl't.

(Endorsed:) U. S. circuit court, so. district of New York. Theodore Clough ag'st The Gilbert & Barker M'f'g Co. Consent for substitution. U. S. circuit court. Filed Dec. 24, 1878. John I. Davenport, clerk.

281 United States circuit court, southern district of New York.

Roger H. Lyon, complainant's sol'r.

THEODORE CLOUGH
vs.
THE GILBERT AND BARKER MANUFACTURING Company, JOHN F. BARKER, and CHARLES N. Gilbert. } In equity. Dec. 24, 1878.

Roger H. Lyon, defendant's sol'r.

THE GILBERT AND BARKER MANUFACTURING Company
vs.
THEODORE CLOUGH. } In equity. Dec. 24, 1878.

On filing the consent thereto of Yeaman & Hall by George H. Yeaman, solicitor for the complainant in the first of said above-entitled causes, and for the defendant in the second of said causes—

It is ordered that Roger H. Lyon be, and he hereby is, substituted in the place and stead of Yeaman & Hall as solicitor for
282 the complainant in said herein first-entitled cause, and as solicitor for the defendant in said herein second-entitled cause.

283 United States circuit court, southern district of New York.

THEODORE CLOUGH
ag'st
THE GILBERT AND BARKER MANUFACTURING Company.

It is hereby stipulated and agreed by and between the parties to the above-entitled cause as follows, to wit:

Whereas it was stipulated and agreed by said parties that upon the trial of said cause either party might read such parts of the testimony as he wishes given in the suit of The Gilbert & Barker Manufacturing Company against Theodore Clough, in said court, and contained in the printed case and exceptions in that suit, as evidence in this cause, subject to the same objections taken on the trial at law in that suit, and that if the court would consent both said causes might be tried together;

284 And whereas said testimony given in such suit of The Gilbert & Barker Manufacturing Company against Theodore Clough was so used as such evidence on said trial of this cause as aforesaid, and said causes so tried; and whereas such stipulation was omitted to be printed in this cause:

Now, therefore, it is stipulated agreed that this shall be entered therein to supply such omission, and to serve as such stipulation the same as if originally duly entered and contained in said printed cases herein.

It is also stipulated and agreed that the exhibits mentioned and referred to herein, and used on the trial of this cause by the parties to the same, shall be allowed to remain with the clerk of the said United States circuit court until the hearing of the appeal herein, when
285 the same may be sent to the clerk of the United Supreme

Court, and used by said parties on the hearing of said appeal as they may desire.

And it is further stipulated and agreed that the foregoing record herein shall be the record to be printed and used as the case on appeal to said Supreme Court in this cause.

Dated Sept. 27, 1879.

STANLEY, BROWN & CLARKE,
Sol'rs for Resp'ts.

ROGER H. LYON,
Sol'r for Appellant.

(Endorsed:) United States circuit court, so. dist. of New York. Theodore Clough ag'st The Gilbert and Barker Manufacturing Co. Stipulation on appeal. U. S. circuit court. Filed Oct. 7, 1879. John I. Davenport, clerk.

286 Supreme Court of the United States.

THEODORE CLOUGH
vs.
THE GILBERT AND BARKER MANUFACTURING Company, John F. Barker, and Charles N. Gilbert.

Due and timely service of the petition for appeal by said Theodore Clough, the plaintiff in the above-entitled cause, to the Supreme Court of the United States, and hereto annexed, is hereby admitted.

New York, January 11, 1879.

STANLEY, BROWN & CLARK,
Att'ys for Def'ts.

(Endorsed:) Supreme Court of the United States. Theodore
287 Clough vs. The Gilbert and Barker Manufacturing Company et al. Admission of service of petition for appeal. Roger H. Lyon, sol'r &c., for appel'ant, 176 Broadway, N. Y.

288 Supreme Court of the United States.

THEODORE CLOUGH
vs.
THE GILBERT & BARKER MANUFACTURING Company, John F. Barker, and Charles N. Gilbert.

To the honorable the Supreme Court of the United States:

The appeal of Theodore Clough respectfully showeth:

That upon the 27th day of May, 1871, the above-named Theodore Clough, complainant, filed his bill of complaint in the circuit court of the United States for the southern district of New York against John F. Barker and Charles N. Gilbert and Elliot P. Gleason, defendants,
289 alleging the copartnership of defendants, and that as such they were doing business at Springfield, Massachusetts, under the firm-name of The Gilbert and Barker Manufacturing Company, and that the said defendants did infringe on a certain letters patent of the United States which were issued to the said complainant on the fourteenth day of June, 1870, for an alleged improvement in gas-burners,

and numbered 104271, the bill showing said complainant to be the original inventor of said improvement and the issue of said letters patent, and charging the defendants with infringement thereof by making, using, and vending said invention and improvement in gas-burners made, as the bill alleged, according to the invention and improvement secured and patented as aforesaid, and also large numbers and quantities of combinations in mechanism wholly or in part
290 the same gas-burner described in said letters patent, said combinations involving the said invention so secured to the said complainant by said letters patent, and made in imitation of said invention and improvement and in pursuance of the process and specifications protected by said letters patent, none of said articles so used or vended by the defendants having been made by any person or persons authorized or licensed thereunto by said complainant; said bill further alleging that by and in consequence of such acts and infringements on the part of said defendants the complainant has been greatly damaged; the said bill further praying that the said defendants be restrained and enjoined from such alleged infringements and from making, using, or vending said gas-burner or article involving, or embra-
291 cing, or constructed in pursuance of said invention and improvement covered or secured to said complainant by said letters patent, and from all violation and infringement of the exclusive rights secured to him thereby, and be compelled to account for and pay to the complainant the gains and profits secured by the defendants from such alleged infringements and the damages which the complainant alleged he had sustained thereby; to which bill of complaint the said defendants John F. Barker and Charles N. Gilbert filed their answer on the 11th day of July, 1871, and the said defendant Elliot P. Gleason filed his answer on the 24th day of July, 1871, and in and by which answer of said Gilbert and Barker, defendants, they respectively deny said copartnership, and that the complainant was the first and original inventor
292 of the alleged improvement claimed in said his letters patent, and that the same was not in public use or sale with the consent and allowance of complainant more than two years before the complainant obtained his said patent, and the alleged utility of said invention, and that they have made and sold said invention or combination thereof as alleged in said bill, and aver that the Gilbert and Barker Manufacturing Company, a corporation organized under the laws of Massachusetts, having a place of business at said Springfield, has manufactured and sold certain improved gas-burners of a new and peculiar construction, constituting a new and valuable improvement in gas-burners, and the subject of letters patent of the United States to John F. Barker,
293 one of the defendants, dated July 26, 1870, and known as Barker's patent adjustable gas-burners, and deny that said burners embrace in their construction and operation anything invented by the complainant or patented by him by his said letters patent, or that said company have thereby interfered with complainant's rights or infringed upon his said letters patent; and they further aver that said letters patent be so construed as to embrace within its claims the passing of gas through perforations at the base of the burner, in combination with the surrounding-tube, then said patent is void, because the subject-matter thereof was known and used by others and patented and described in printed publications in the United States long before
294 the time of said patent, and in public use in the United States two years before complainant's application for his said patent, but at the same time averring that it should not be so construed, and

that when rightly construed do not embrace the burners made by defendants or said company; and they further aver that the bat-wing gas-burner, and the same in combination with a surrounding-tube, and the same perforated at the base, in combination with the surrounding-tube, has been for many years prior to complainant's alleged invention in public use in the United States under protection of other letters patent therein set forth. The answer of the said defendant Gleason is in effect the same as that of said defendants Gilbert & Barker, admitting the sale of certain gas-burners for said The Gilbert & Barker
295 Manufacturing Company, known as those of The said Barker patent, and to the extent only of some six dozen. That exceptions to both said answers were filed by said complainant on the 10th day of August, 1871; that an order of said court was duly entered and filed on the first day of September, 1871, based upon an agreement and stipulation between the parties to said cause, amending the issues therein, and which was made a part of the order of said court, and which order also provided, among other things, that the plaintiff's motion for a preliminary injunction be withdrawn, without prejudice to his prayer for final and perpetual injunction or the other relief demanded in his bill of complaint, and that said original bill be amended by making the Gilbert and Barker Manufacturing Company
296 a party defendant thereto, and said original bill dismissed without prejudice as to said defendant Elliot P. Gleason, and that a feigned issue be granted to try at law the following questions:

First. Whether or not the complainant is the first and original inventor of the improvement in gas-burners for which said letters patent were granted? Second. Whether or not the gas-burners manufactured by the defendants are substantially identical with those described in the complainant's said letters patent and schedule thereunto annexed in their construction and mode of operation? Third. If an infringement has been made out by the complainant, what amount of damage has been sustained by him? And it was further ordered that said com-
297 pany have 30 days to file its answer to said bill; and it was further ordered that the defendants give the same notice of their defence on the trial of said issues at law, and within the same time, that would be required if the trial was an action at law.

That in pursuance of said order, on the 1st day of September, 1871, said complainant filed an amended bill, alleging that the Gilbert and Barker Manufacturing Company, of Springfield, Massachusetts, did likewise infringe said letters patent at the times and in the manner substantially as alleged against said defendants in said original bill, and is a necessary party to said action, and that said defendants John F. Barker and Charles N. Gilbert are both members and corpora-
298 tors of said The Gilbert and Barker Manufacturing Company, and have been since March 7, 1870, the former treasurer and the latter general agent thereof, and so acting respectively as such treasurer and general agent since the organization of said company, and by and under the authority of the board of directors thereof in the management and conduct of its business, which is the manufacture of gas burners and fixtures, and are the only members of said company known to the complainant; said amended bill further praying that said company be made a party defendant in said suit and be required to answer said original and amended bill, and for the like relief against said
299 company as prayed against the defendants in said original bill.

That said defendants, John F. Barker, Charles N. Gilbert, and The Gilbert and Barker Manufacturing Company, filed an amended an-

swer in said cause on the second day of December, 1871, which said amended answer contains the same denials and averments in substance as said original answer herein.

That the complainant thereupon filed his replication on the 28th day of November, 1871, both to said original answers and said amended answers; that thereupon, on the 18th day of December, 1871, an order was duly entered in said court ordering that said cause be placed on the calendar of said court for the then October term, thereof and the issue date as of September 20, 1871, and the issues of fact and
300 said questions be tried as above settled in said order of September 1st, 1871, and as directed in said order, and for that purpose that said cause be placed on the jury calendar of said court.

That thereupon said issues in said cause came on for trial in regular order as reached, having been duly noticed on the calendar of said court for the trial by jury of actions and issues of law, before the Hon. Nathaniel Shipman, judge, and a jury, on May 22, 1874, and the first and second of said issues tried, the third of said issues having been withdrawn by consent of counsel; and after hearing the evidence, the arguments of counsel, and the charge of the judge upon the trial of said issues, said jury thereupon found as their verdict, in answer to said first question or issue, that the complainant is the first and
301 original inventor of the improvement for which the above-named patent is granted to him, and in answer to the said second question or issue, that the gas-burner manufactured by the defendants are substantially identical with those described in the complainant's patent and schedules thereunto annexed in their construction and mode of operation.

That thereupon the defendants caused a case to be made of the bills of complaint, pleadings, evidence, judge's charge to the jury, exceptions taken, and the proceedings in said cause and the trial thereof, with leave to turn the same into a bill of exceptions, and moved for a new trial of said issues upon such case and exceptions. And the court before which said issues were tried, after hearing arguments of
302 counsel for the respective parties, overruled and denied said motion, the opinion or decision of said court thereon having been duly filed on the 23d day of September, 1874. That thereupon said cause, upon all said proceedings therein, with the certificate of the proceedings at said trial by said judge who presided at the same, and upon due notice, came on to be heard for a final decree therein at a special term of said court, held at the February term thereof, 1877, on the 5th day of March, 1877, before the Hon. Alexander S. Johnson, late judge of said court, and was duly argued before him by the respective counsel for said parties, but said judge departed this life before deciding the same.

That thereupon, upon application and consent of counsel, an order was made and filed in said court on the 18th day of February,
303 1878, placing said cause upon the calender of said court at the then present equity term thereof; and thereupon the same and all said proceedings therein came on in regular order to be heard before Hon. Samuel Blatchford, judge of said court, at the April term thereof, 1878, on the 15th day of May, 1878, and, after hearing the arguments of counsel for the respective parties in said cause, rendered an opinion or decision therein filed October 14th, 1878, adversely to the complainant in this, that the first claim of said Clough's patent is invalid for want of novelty, and that the defendants had not infringed the second claim of said Clough's patent; whereupon a decree was duly announced,

entered, and filed herein, on due notice of settlement, on the 4th day of January, 1879, whereby it was ordered, adjudged, and decreed that the complainant's said bill be dismissed, and that said defend-
304 ants recover of said complainant $350.90 costs, taxed and allowed herein.

Wherefore this appellant appeals from the whole of said decree of the circuit court of the United States and prays that said decree and the bill, answers, amended bill, and amended answer, pleadings, stipulation, order thereon, evidence, case, and exceptions, and proceedings in the cause may be sent to the Supreme Court of the United States without delay; and that the said Supreme Court will proceed to hear the said cause anew, and that the said decree of the circuit court and every part thereof may be reversed, and a decree made herein sustaining the said bill of complaint, granting the prayer thereof for relief, with costs to the complainant, and such other and further decree as to the Supreme Court shall seem meet.

THEODORE CLOUGH.

305 ROGER H. LYON,
Solicitor for Complainant and Petitioner, and of Counsel.

UNITED STATES OF AMERICA,
Northern District of New York, ss:

On this 10th day of January, 1879, before me, personally came and appeared the above-named Theodore Clough, who, being duly sworn, deposeth and saith that he is the petitioner in the foregoing petition, and has read the same and knows the contents thereof; that the said petition is true of his own knowledge, except as to those matters which are therein stated to be on his own information and belief, and as to those matters he believes it to be true.

THEODORE CLOUGH.

Sworn to before me this 10th day of January, 1879.

JOHN SHIELDS,
U. S. Com'n'r, S. D. of N. Y.

306 (Endorsed:) Supreme Court of the United States. Theodore Clough against The Gilbert and Barker Manufacturing Co. et al. Petition. Roger H. Lyon, sol'r, &c., for complainant, 176 Broadway, N. Y. U. S. circuit court. Filed Jan'y 11th, 1879. John I. Davenport, clerk.

307 Circuit court of the United States of America for the southern district of New York, in the second circuit.

THEODORE CLOUGH
vs.
THE GILBERT AND BARKER MANUFACTURING Company, JOHN F. BARKER, and CHARLES N. Gilbert.

Know all men by these presents that we, Theodore Clough, of Dobbs Ferry, Westchester County, State of New York; Joseph Hasbrouck, of Dobbs Ferry, Westchester County, State of New York; and John E. Doubleday, of No. 612 Lafayette avenue, city of Brooklyn, State of New York, are held and firmly bound unto the above-named The Gilbert and Barker Manufacturing Company, John F. Barker, and Charles N. Gilbert in the sum of one thousand dollars, to be paid to

the said The Gilbert and Barker Manufacturing Company, John F. Barker, and Charles N. Gilbert, for the payment of which well and truly to be made we bind ourselves, and each of us, our and each of
308 heirs, executors, and administrators, jointly and severally, firmly by these presents. Sealed with our seals and dated the eighth day of January, in the year of our Lord one thousand eight hundred and seventy-nine.

Whereas the above-named Theodore Clough hath taken an appeal to the Supreme Court of the United States to reverse the decree rendered in the above-entitled suit by the judge of the circuit court of the United States for the southern district of New York:

Now, therefore, the condition of this obligation is such that if the above-named Theodore Clough shall prosecute said appeal to effect, and answer all damages and costs if he fail to make the said appeal good, then this obligation shall be void, otherwise the same shall be and remain in full force and virtue.

THEODORE CLOUGH. [L. S.]
JOSEPH HASBROUCK. [L. S.]
JOHN E. DOUBLEDAY. [L. S.]

Sealed and delivered and taken and acknowledged this eighth day of January, 1879, before me.

JOHN A. SHIELDS,
U. S. Com'r, S. D. of N. Y.

309 UNITED STATES OF AMERICA,
Southern District of New York, ss:

Joseph Hasbrouck and John E. Doubleday being duly sworn, doth each depose and say, and each for himself saith, that he is worth the sum of one thousand dollars over and above all his just debts and liabilities.

JOSEPH HASBROUCK.
JOHN E. DOUBLEDAY.

Sworn to this 8th day of January, A. D. 1879, before me.

JOHN A. SHIELDS,
U. S. Com'r, S. D. of N. Y.

(Endorsed:) U. S. circuit court, south. dist. of N. Y. Theodore Clough vs. The Gilbert and Barker Manufacturing Co. et al.
310 Bond on appeal.
The within bond approved.
Jan'y 11th, 1879.

SAMUEL BLATCHFORD, *C. J.*

U. S. circuit court. Filed Jan'y 11th, 1879. John I. Davenport, clerk.

311 Supreme Court of the United States.

THEODORE CLOUGH
vs.
THE GILBERT AND BARKER MANUFACTURING Company, John F. Barker, and Charles N. Gilbert.

Whereas Theodore Clough has appealed to the Supreme Court of the United States from a decree lately rendered in the circuit court of

the United States for the southern district of New York, second circuit, made in favor of you, the said The Gilbert and Barker Manufacturing Company, John F. Barker, and Charles N. Gilbert, and has filed the security required by law: You are, therefore, hereby cited to appear before the said Supreme Court, at the city of Washington, on the second Monday of October, 1879, to do and receive what may appertain
312 to justice to be done in the premises.

Given under my hand at the city of New York, in the southern district of New York, in the second circuit, the eleventh day of January, in the year of our Lord one thousand eight hundred and seventy-nine.

SAMUEL BLATCHFORD,
Circuit Judge.

(Endorsed:) Supreme Court of the United States. Theodore Clough against The Gilbert and Barker Manufacturing Co. et al. Citation. Roger H. Lyon, sol'r for appel'ant, 176 Broadway, N. Y.

313 Due and timely service of the within citation is admitted.
New York, Jan'y 13th, 1879.

STANLEY, BROWN & CLARK,
Att'ys for Def't.

Filed Jan'y 13th, 1879.

314 UNITED STATES OF AMERICA,
Southern District of New York, ss:

I, John I. Davenport, clerk of the circuit court of the United States of America for the southern district of New York, in the second circuit, do hereby certify that the foregoing pages, numbered from one to 313, inclusive, contain a true and complete transcript of the record and proceedings had in said court in the case of Theodore Clough against The Gilbert and Barker Manufacturing Company, John F. Barker, and Charles N. Gilbert, as the same remain of record and on file in said office.

In testimony whereof I have caused the seal of the said court to be hereunto affixed, at the city of New York, in the southern district of New York, in the second circuit, this tenth day of October, in the year of our Lord one thousand eight hundred and seventy-nine, and of the Independence of the said United States the one hundred and fourth.

[SEAL.] JOHN I. DAVENPORT, *Clerk.*

(Indorsement on cover:) No. 330. Theodore Clough, appellant, vs. The Gilbert & Barker Manufacturing Company, John F. Barker, & Charles N. Gilbert. S. New York C. C. U. S. Filed 13th October, 1879.

REC. 330—10

SUPREME COURT OF THE UNITED STATES
FILED
OCT 23 1882
JAMES H. McKENNEY, Clerk

16-166

SUPREME COURT OF THE UNITED STATES.

No. 64.

THEODORE CLOUGH,
Complainant and Appellant,

vs.

THE GILBERT & BARKER MANUFACTURING COMPANY ET AL.,
Defendant and Appellee.

Appeal from the Circuit Court of the United States for the Southern District of New York.

Brief for the Appellant.

Filed

EDWARD N. DICKERSON,
Of Counsel.

U. S. Supreme Court.

THEODORE CLOUGH,
Appellant,

vs.

THE GILBERT & BARKER MANUFACTURING COMPANY ET AL.,
Appellees.

No. 64.

Brief of E. N. Dickerson for Appellant.

Theodore Clough invented a gas burner for burning what is called air-gas, a mixture of atmospheric air and the vapor of naphtha, or of some of the lighter elements of petroleum. That compound is not a fixed gas in the sense in which ordinary street gas is fixed, but is a mechanical mixture, varying very much in its proportions, is heavier than air, and is very difficult to burn without either producing a smoky flame or a feeble one. These difficulties have long been perfectly well understood; and it is thoroughly established that Clough invented the apparatus which overcomes them, and which practically has revolutionized the art (folio 54 and 83).

It also is established without contradiction, that when the inventor had made his invention, he took it to the defendants, large manufacturers of gas apparatus, for the purpose of having them adopt it, and that they sent it to their factory for trial; that they made no report to the inventor of

the result, but very soon appeared in the market with gas burners, which, it is admitted, intringe the most important claim of the inventor's patent, but which are modified in respect to one of the minor details, and for which modification one of the defendants obtained a patent (fol. 55 and 65).

The original patentee filed his bill against these persons who had thus surreptitiously appropriated his invention; had they set up the usual defenses, naming various persons who were said to be the first inventors of the thing patented; whereupon, the parties entered into an agreement (folio 48).

"That the plaintiff and defendants will, by their counsel, "unite in a motion or demand for a *trial at law of the issues* "*herein*, by a jury, at the next regular term of this court."

This anomalous demand by both parties was granted by the court, and the following issues, in conformity therewith, were sent for trial by the jury.

"*First.*—Whether or not the complainant is the first and "original inventor of the improvement in gas burners, for "which the first above named patent has been granted to "him?

"*Second.*—Whether or not the gas burners manufactured "by the defendants, are substantially identical with those "described in the complainant's patent and schedule thereto "annexed, in their construction and mode of operation?" (fol. 59.)

It is to be remarked that this was not a *feigned issue*, ordered by the court for the purpose of informing the conscience of the Chancellor, but it was a trial at law by the jury, agreed upon between the parties, for the settlement of the questions at issue; wherein it differs somewhat in its operation and effect from the ordinary trial of a feigned issue under the directions of the Chancellor. In this case the parties agreed to submit their case to the jury; in the other the Chancellor asks for information and may disregard it when given.

This trial at law was conducted by his Honor, Judge Shipman; and every question that could be raised *in a trial at law*, was raised, as the court will see by the record (pages

59 to 66). The judge charged the jury exactly as if it had been an action on the case; and did so as he said (p. 62), because none of the questions had been settled by the court which ordered the trial.

The result of the trial was a verdict in favor of the patentee upon both issues; that is, the patent was found to be valid, and the defendants were found to have infringed it entirely. A motion was made for a new trial, before Judge Shipman, just as if it had been a regular action on the case; and then his Honor reviewed the trial and its results, denied the motion for a new trial, and expressed the opinion that the verdict was correct and in conformity with the evidence (p. 83).

The record, down to page 87, is the record of the proceeding thus taken. The testimony of witnesses is the testimony given before the jury, so far as it is reported, and it constitutes the only testimony in this case which was taken in it.

From page 87 to 122 is testimony which was taken in a suit by the Gilbert & Barker Manufacturing Company against Theodore Clough, the complainant in this case, and which seems to have been used by stipulation.

Upon this record the case went to final hearing before Judge Blatchford, who disregarded the verdict of the jury, and entered a decree dismissing the bill, holding: *First*. That the first claim of the Clough patent was anticipated by a gas burner which had been constructed by Horace R. Barker, and upon which he had applied for a patent; and *Secondly*. That the defendants did not infringe the second claim of Clough's patent. And this appeal brings these two decisions for review.

The Invention.

The gas burner described in Clough's patent consists:

First.—Of an ordinary fish-tail burner, with the ordinary *fixed slit* in the top of it for the emission of the gas.

Second.—A tube, *open at the top*, surrounding the column

of the fish-tail burner, and leaving a *fixed annular space* between the interior of the tube and the exterior of the column; the top of the tube terminates just below the lower edge of the slit in the fish-tail burner.

Third.—Small perforations at the base of the column supporting the fish-tail burner, to permit gas to flow from the inside of the fish-tail burner column into the annular space contained between the tube and the outside of the burner column.

Fourth.—A valve arrangement so constructed that by turning the burner upon its vertical axis these perforations will be more or less opened or shut, so as to regulate the flow of gas from the interior of the burner column through its base into the annular space.

The picture of this burner is at page 114 of the record, appended to the specification of the patent.

When the burner is in use, a fish-tail flame issues out of the slit, which is of fixed dimensions and of the ordinary shape.

Also, an annular stream of gas flows up through the annular space from the perforations at the base; and when it reaches the atmosphere it is ignited, and burns in connection with the fish-tail burner, producing a double flame, one part of which is fish-tail, the other is cylindrical and annular.

The *dimensions* of the annular flame and of the fish-tail flame are both constant; but the *density* of the annular flame is varied by varying the size of the perforations by means of the valve, so that more or less gas may be flowing through the annular space, while the amount flowing through the fish-tail split is constant, giving different velocities (fol. 202).

That this combination was specifically new there is no dispute in the case; that it is very valuable is equally undisputed. What his Honor Judge Blatchford found in respect to it was not that the specific burner shown in that patent was old, but that another burner, differently constructed, anterior to this one, contained the combination *covered by the first claim* of Clough's patent, and, therefore, Clough's patent is invalidated.

The two burners are very different in object, construction and operation; and the question comes up whether Clough's patent is so drawn that it *must* be construed to include the former burner, different in object, construction, and operation, and must, therefore, become invalid.

There are *five* reasons why it should not be so construed:

First.—The patent itself was granted in full view of the anticipating burner, which itself was in the Patent Office, on an application which had been rejected for want of novelty, there being already a patent for it to another inventor, named Coolidge.

Secondly.—The law requires that the patent should be construed to save it, and not to defeat it, and if there be two possible constructions of it, that rule will save it; and there is a construction which will save it, even if there is one possible which will defeat it, which is denied.

Thirdly.—The two inventions are different in their actual construction and actual operation, whatever may be the legal import of the language of the patent.

Fourthly.—On the trial of the action at law, a trial selected by the parties, the jury found the invention to be novel, not withstanding the prior existence of the burner supposed to anticipate it.

Fifthly.—The judge who tried that case, on a motion for retrial, confirmed the verdict of the jury after hearing the witnesses himself in open court; so that we have the verdict of the jury, and one of the judges of the Circuit Court, who had the advantage of hearing and seeing the witnesses, against the finding of the Circuit Judge; and under those circumstances it should seem that it cannot be so clear a case against the patent that its *prima facie* should be overthrown.

The Construction of the Patent.

The specification describes the invention to be an improvement in "air gas burners" (p. 67). It then states that "bat wing or fish tail burners are not adapted to the burning of this gas as *ordinarily* made," and that "the object of my improvement is to *adapt* the slitted or bat wing burner to the burning of air gas."

These burners, "as ordinarily made," have a slit of fixed size across the top, through which the gas issues; and this fixed slit burner is the starting point of the improvement, and to which is to be added something else in order to adapt it to the burning of air gas.

The improvement is said to consist, first, "in perforating the base of the burner tube with small holes or passages for the gas to escape at the base of the burner, and surrounding the burner with a tube *open at the top, but closed at the bottom*, and united to the burner below the perforations in the burner tube."

Now, this is a perfectly specific distinct description of the thing shown in the drawing:—namely, a tube, surrounding an ordinary fish tail burner, open at the top, and with perforations at the bottom. When operating, this open top delivers an annular current of gas as *thick* as the space made by the construction of the burner. The *density* and velocity, however, are to be regulated by regulating the perforations at the base through which the gas flows. The specification then proceeds to state, what is admitted to be the truth, that this arrangement gives steadiness and increased illuminating power to the flame of the bat wing burner, and makes it a desirable burner for burning air gas.

Upon this first combination the first claim is founded, and is in these words:

"A bat wing burner, perforated at the base, in combination with the surrounding tube, substantially as described?"

The obvious construction of this claim is that it specifies what the description has fully set out, namely, the *ordinary fish tail burner, with a tube open at the top, and with perforations at the base.*

That construction is certainly *one* proper construction; and in order to make that claim cover more than those specific elements thus described, it is necessary to expand it by construction, which certainly will not be done for the purpose of *defeating* the patent.

The Anticipating Device.

The defendants put in evidence an application for Letters Patent by Horace R. Barker (p. 69), as an anticipation of the Clough first claim, and they proved that a few gas burners—about 25 in all (fol. 56)—had been made according to the description and drawings contained in that application. The jury and Judge Shipman found that it was not substantially the same invention as the one made by Clough; but his Honor Judge Blatchford construes the Clough patent to include it, and, therefore, decides against it.

The inventor states the object of his invention to be "to "control and regulate the flow of gas *at the burner*, instead "of the cock or generator, thereby reducing or increasing "the size of the flame without reducing the pressure of the "gas," and he discriminates against the ordinary slotted gas burner, which is one of the elements of Clough's patent, by saying: "In the *ordinary slotted gas burner the slot is a* "*fixture*, and cannot be varied except by positive enlarge- "ment, and it cannot be reduced, consequently the flow of "gas and the size of the flame must be regulated by turning "the cock; by this means, and with some kind of gas, par- "ticularly that made from 'naphtha,' 'gasoline,' and other "volatile oils or fluids, the *flame cannot be regulated*, and "it becomes necessary to dilute the gas, so rich with carbon, "by admitting or by forcing air into the apparatus between "the vaporizing or gas generating machine and the burners" (p. 70, folio 149).

He then describes his invention, which in substance is a means for pinching together, or permitting to separate, the two sides of a spilt gas burner, whereby the opening may be made wider or narrower, as desired. For that purpose he slits the entire column of the gas burner from top to bottom, separating it into two halves, thereby permitting the points

to be drawn together to narrow the aperture, while at the same time the elasticity of the separated parts thus contracted will tend to open them when the constraint is relieved. In order to do this a conical projection is left upon the column, and the sleeve or tube is slipped down over the column fitting upon the conical projection, and as this sleeve or tube is shoved down upon the cone, the effect is to squeeze together the opposite sides narrowing the slit; lifted, it allows the elasticity to open the slit. There are two ways of working this sleeve, one of which is shown in Figure 5, where a screw thread is cut upon the cone itself, and a corresponding screw thread on the inside of the sleeve, and the contraction is obtained by screwing down the sleeve on that conical screw. The other is shown in Fig. 1, whereby the screw thread is at the base, and the contact between the sleeve and the cone is a plain surface. In both cases, however, the sleeve is designed to be in contact with the cone, so that gas does not escape there; and the application specifically states that Figure 1 and 2 show the burner in condition for burning naphtha gas, where the slit is "more open than for burning coal gas," but where the "two sides of the tube *a* are drawn together." By looking at the drawing, Figure 1 and 2, thus described, it is apparent that the sleeve has just begun to contract the slot, and is not screwed down to a point where it would contract it still more, and where it would be suitable for coal gas, just as the patent describes it to be. The same condition exists in Figure 5, where there is a considerable space below the sleeve on the base through which it can be secured down to contract the slot still more. The patentee also says that "for burning coal gas the slot, when open, should be about as shown in Figure 3."

The whole object of the invention is to regulate the width of the slot in this spring burner so as to adapt it to the emission of more or less gas, as circumstances require; but, in all cases, the apparatus is shown and constructed to perform no other function than that; and the outside barrel is not a tube "open at the top" for the purpose of supplying a regulated flow of gas to the bat-wing burner, but is a contracted and conically closed top for the purpose of operating mechani

cally upon a spring, to contract or to permit it to expand. And so it is described throughout the entire specification, without any suggestion whatever of any other possible use.

It, however, is probably true that, when made in the form shown in Figure 1, some gas might leak out through the joint between the barrel and cone when the two surfaces in contact do not precisely coincide, as they would not geometrically considered in all positions of contraction; but this was a defect in the apparatus and not its object.

Mr. Renwick (fol. 105), a professional expert on the subject, suggested that in time the elasticity of the brass burner would be impaired by heat, and in that case, when the outer barrel was raised, the burner would not expand to follow it, and then there would be an opening; but if that were so, it was not the object of the instrument, and no invention was made for the purpose of producing the effect which Clough produced in his burner.

The entire case of the defendants, founded upon this Horace R. Barker burner, is this, and no more—that being made for the purpose of regulating the width of the slit in a spring burner, it would in a defective way, and when the barrel had lost its elasticity by use, and so had got out of contact with the surface against which it was designed to impinge, permit some gas to pass between the burner and the barrel, which, of course, would be consumed in the air; and the simple question is, does that apparatus, assuming it to have operated in the defective manner suggested by the expert, anticipate the invention covered by the Clough patent? Obviously it does not. It does not perform the functions which the Clough burner does perform; and is not capable of performing them under any possible circumstances.

First.—In the Clough burner, an open top tube delivers an annulus of gas of constant dimensions to the fish tail burner, which also has a fixed aperture incapable of being varied. In the Barker burner, no gas can be delivered through the barrel outside of the fish-tail burner, until that burner has lost its elasticity, and until the barrel has been raised above the contact with the conical projection against

which it is designed to be always in contact. And then whatever it delivers is of variable dimensions, according to the distance of the barrel from the cone; and when the fish tail burner is reduced to its ordinary dimensions, no gas can escape at all around the barrel except by leakage.

Secondly.—The burner itself in the Barker apparatus is the *adjustable* quantity; whereas, in the Clough burner it is the *fixed* quantity. In the Barker burner the accidental aperture for the escape of gas outside of the burner is the accidentally variable quantity; whereas, in the Clough burner it is the fixed quantity. In the Clough burner there are apertures at the base of the burner, and at the bottom of the annular space through which the gas is wiredrawn into the annular space which it fills with more or less density according to the dimensions of the apertures. In the Barker burner this annular space has no apertures at its base, but is in open connection with the gas by two long slits, and is filled with gas under the same pressure as in the burner and it is designed to be retained there and not allowed to escape; but from which, if it does escape, it is coming out with the same force as from the fish-tail burner itself. The reason of this is, as the exhibit shows, that the double slit up and own the burner is vastly longer and larger than any accidental or other opening around the top of the barrel. In the Clough burner the regulation of the annular stream of gas is at the base of the burner, where it is done independently of the pressure in the fish-tail itself; whereas, in the Barker burner, when a current is accidentally flowing, there is no regulation of the pressure at all, but a contraction of the annular opening whereby more or less gas might be permitted to escape but under the constant pressure.

These are the obvious distinctions between the two things and if it were assumed that the Barker burner had been constructed to operate in the abnormal manner, in which it is said to operate when it has become defective, it would not anticipate a patent for the construction shown in the Clough patent, which operates in such an entirely different manner.

To present the question in its most favorable possible light for the defendant, and much more favorable than the

truth warrants, it would be this: Suppose Barker to have invented a burner *for the purpose* of burning air gas by means of two flames –one fish tail, and the other annular, which *mode* of burning he had also invented—and that burner consists of a *variable fish tail* burner controlled by an outside barrel which closes and opens it, but which barrel, also, in a certain position, permits an annular flame to escape of the same pressure as the fish tail flame, and is capable of varying the dimensions of the annular aperture where the flame occurs. Then is it new, and patenable, to alter the character of the elements in this combination so as to modify their operations whereby an improved result ensues, in the manner in which Clough has done it? That is, to substitute for the variable fish tail burner of Barker the "*ordinary*" one which his invention attempted to improve; to substitute for his barrel, whose primary object was to contract or expand the fish tail burner, and which is closed at the top more or less and has a variable opening, a cylindrical tube "*open at the top*" with a constant opening, to deliver a current of gas, of *constant dimensions*, but of *varying density*, instead of a current of *varying dimensions and constant density*; and to substitute for the *opening* capable of being varied at the *outlet* of the annular space, an opening capable of being varied at the *inlet* of the annular space, whereby the gas is diminished in density before it reaches the air?

The question answers itself. Of course is is.

Then, has not Clough such a patent? Its first claim is for that very device, and is not a claim for a principle of action at all.

If Barker had invented –as he obviously did not—the principle of action exhibited in the Clough burner, and had described it as such, and patented the combination of the two flames for air gas *substantially as described*, yet Clough's patent would be a valid one for his better arrangement of the elements; and no one would have thought that his patent, just as it is now drawn, would cover Barker's apparatus, and be void. It would, of course, be construed in view of the former patent, to save it from such a fate; much more must it be so construed, when it is plain that Barker made no such invention and when it is admitted

that the resemblance between the things only occurs accidentally, and when the Barker burner acts in a manner not intended in its construction, and exactly contrary to its intention.

If the claim of the Clough patent were for supplying to any kind of bat-wing flame an annular current of gas without regard to the means employed or the character and quality of their operation, then such a claim as that would be anticipated by showing that the Barker burner, although not designated to do that thing, had actually been put into public use for doing it, and had done it practically successfully. But under those circumstances it would still be patentable to make the arrangement shown in Clough's patent for doing the same thing better; and it would be no answer to a charge of infringement that Barker's burner had done that same thing in a different and a worse way. It is patentable to do an old thing in a better way.

AS TO THE SECOND CLAIM OF THE CLOUGH PATENT.

This claim is for four elements, namely, the tubular valve for regulating the supply of external gas to the burner, with the three of the first claim, substantially as described; the first claim being for the burner, perforations, and tube, whether a valve is applied to the perforations or not.

When the defendants were shown Clough's invention and undertook to test it, John F. Barker suggested a modification of the tubular valve, which is a simpler one to make than the one shown in the Clough patent. It does not perform any other or different office from the one shown in Clough's patent, nor does it perform it in any better way, so far as the regulation of the gas is concerned.

In Clough's burner the perforations run through the burner column at or near its base, thus connecting the outside tube with the inside column of gas. In Barker's they do precisely the same thing in the same place.

The problem in both cases is to screw over those apertures a valve that will control the gas. Clough does it by screwing down the entire burner over the tube upon which it stands, and which, therefore, shuts off the holes. Barker

revolves the outside tube alone over the stationary burner, and it screws over the holes; and the question is whether in view of the original patent, that is not "*substantially as described.*"

The jury and Judge Shipman said it was; and the reasons why it is are these: both arrangements are old, considered as valves; both produce precisely the same effect, and are in the same combination. The one valve is the equivalent for the other in the combination, and was well known to be so before either instrument was made; and the law is well settled that in a claim for a combination, the substitution of one equivalent for another in one of the elements does not relieve the substituted combination from the charge of infringement.

It was very old to regulate the supply of gas for burners; and generally it was done by tubular valves—that is, one pipe over another, moving up or down so as to cover or uncover openings in the pipe. Examples of these things are in the record, and were set up by the defendants as an anticipation of Clough's patent. Solliday's gas burner of 1849 has an outside sleeve, which screws up or down outside of the fish-tail burner, and contracts the opening through which the gas is escaping, thereby diminishing its flow. It is *exactly* the outside sleeve of the Barker burner, so far as it operates as a valve, and so Barker swore in his case specifically (fol. 221).

Lunkenheimer's burner has an inside plug which screws down into the gas passage and shuts off the holes that perforate it sidewise, thereby diminishing or increasing the flow of gas. And many other varieties of the same thing were well known. Brownell, the defendant's expert (fol. 110), proves all this.

The question, then, comes up whether Barker could have the benefit of the new and valuable combination invented by Clough, because he changed the form of the tubular valve from one to another of the well known forms of that apparatus; and in view of the law and the facts, I submit that the jury and Judge Shipman were right in their conclusion.

It is nothing to the purpose to say that Barker has a patent for the modification of the invention which he shows.

If his patent is good, it is for an improved equivalent, but it does not entitle him to use the patented combination to which this improved equivalent is applied.

John F. Barker, who made this modification of the Clough burner and took the patent for it, and is the acknowledged infringer of the first claim of the Clough patent, if that claim be valid, is the brother of Horace R. Barker, whose gas burner is said by the decision to anticipate the claim of the Clough patent.

He testifies that, "as a matter of fact, Horace R. Barker's burner was in operation in our factory in Springfield, in 1868" (fol. 120), and he, therefore, knew all about it when he patented his modification of the Clough burner. But when he prepared his specification, he did not refer to the Horace R. Barker burner as one on which he was improving, or as one which would do the thing his burner does; but, he says (p. 79): "I am aware that gas burners have "been heretofore made to give an additional supply of gas "to the flame, *but in those that I have seen*, they consisted of "more pieces, and were considerably more expensive to "manufacture; and in their operation the burner revolved "with the tube, thus causing the flame to revolve also. "This is very objectionable, as it is often desirable to have "the flame stand in one particular direction."

This is a sworn statement by John F. Barker, with full knowledge of the Horace R. Barker burner; and it ignores that burner entirely and describes the Clough burner specifically. "Those that I have seen," he says, which "give an additional supply of gas to the flame," "consisted of more pieces" than his, "and in their operation the burner revolved with the tube."

Neither of these characteristics belong to the Horace R. Barker burner, since it is made of two pieces only, and the burner does not revolve with the tube; but it does apply to the Clough burner, which is made up of three pieces, and in which the burner does revolve with the tube. It is obvious, therefore, that at that time he did not suppose that the Horace R. Barker burner had been "heretofore made "to give an additional supply of gas to the flame."

The same patent also describes minutely the operation of

the valve arrangement, and discriminates it from the Clough patent in these words (p. 79): "In this device the flame "does not turn in the least, while the whole burner may "consist of only two pieces, and is cheaply made, and its "operation and effect are perfect."

He does not pretend that the valve performs any other or different office in the combination in the one case than in the other, so far as regulating the flame is concerned. As constructed, one form of valve requires the entire burner to be turned in using it, the other form does not; but both forms were old and well known. It certainly does not relieve the defendants from the charge of infringement that the form of valve used by them, while it performs exactly the functions of the valve described in the patent, permits the burner to stand still when the valve is turned, whereas in the patented arrangement it does not; and much more is that true when both forms of valves were well known.

And John F. Barker expressly swore that the Horace R. Barker burner needed to be improved (fol. 117), and that it was a different device from his (fol. 120); in which he agrees with Judge Shipman and the jury.

EDW. N. DICKERSON,
For Appellant.

16-164

THE SUPREME COURT OF THE UNITED STATES.

No. 64.

October Term, 1882.

THEODORE CLOUGH,
Appellant,

vs.

THE GILBERT & BARKER MANUFACTURING COMPANY, JOHN F. BARKER, and CHARLES N. GILBERT,
Appellees.

BRIEF FOR APPELLANT.

ROGER H. LYON,
For Appellant.

In the Supreme Court of the United States.

THEODORE CLOUGH,
Appellant,

vs.

THE GILBERT AND BARKER MANUFACTURING COMPANY, JOHN F. BARKER and CHARLES N. GILBERT,
Appellees.

Brief for Appellant.

Statement.

This is an appeal from the decree of the Circuit Court for the Southern District of New York, entered January 4th, 1879, dismissing the complainant's bill, with costs. (See fols. 277–280).

The suit was brought for an infringement of certain Letters Patent granted by the United States to the appellant, dated June 14th, 1870, and numbered 104,271 for improvement in gas-burners. (See Letters Patent and Specifications, fols. 143–147).

The bill of complaint alleges the appellant to be the original inventor of said improvement and charges the respondents with such infringement by making, issuing and vending at divers times since

June 14th, 1870, in the City of New York and elsewhere within the jurisdiction of said Court, said invention and improvement in burners made as therein alleged according to the invention and improvement secured by his said Letters Patent, and also large numbers and quantities of combinations in mechanism wholly or in part the same gas-burner described in said patent and involving the said invention, and made in imitation thereof, and in pursuance of the process and specifications protected thereby, none of said articles so used or vended by the respondents having been made by any one authorized or licensed thereunto by the appellant. (Bill of Complaint, fols. 3–9 and as amended, 34-36.)

(Exhibits A. and B. are such alleged infringements.)

The respondents set up in their answer that they have not infringed said Letters Patent, claiming that the improved gas-burners manufactured by them, referred to in the bill of complaint, were of a new improvement, the subject of certain Letters Patent granted by the United States to John F. Barker, July 26th, 1870, and numbered 105,768. (See Letters Patent and Specifications, fols. 154–152).

Respondents further answering, also allege that said Letters Patent granted to the appellant herein are void for want of novelty, claiming that if said Letters Patent be so construed as to embrace within its claims the passing of gas through perforations of the base of the burner in combination with the surrounding tube, then said Letters Patent are void, because they say the subject matter thereof was known and used by others, and was patented and described in printed publications in the United States long before the patented invention thereof by the appellant, and was also in public use in the

United States more than two years before the appellant's application for said patent and with his consent and allowance. But at the same time averring that it should not be so construed, and when rightly construed said Letters Patent do not embrace any gas-burners made by respondents.

And still further answering, alleging that the bat-wing gas-burners and also bat-wing gas-burners in combination with surrounding tube and also bat-wing gas-burners perforated at the base in combination with the surrounding tube, have been for many years prior to the alleged invention of the complainant well known and in public use in the United States under protection of other Letters Patent, and as otherwise set forth therein. (See Ans., fols. 38–44, exhibits).

The device mainly relied upon by the respondents, however, upon the question of priority, was the Horace R. Barker burner. (See rejected application, fols. 147–153. Exhibits).

On September 1st, 1871, an order of said Circuit Court was duly entered and filed, based upon a stipulation between the parties to said cause, providing, among other things, that a feigned issue be granted to try at law the following questions:

"*First.*—Whether or not the complainant is the first and original inventor of the improvement in gas-burners for which said Letters Patent were granted?

"*Second.*—Whether or not the gas-burners manufactured by the defendants are substantially identical with those described in the complainant's said Letters Patent and schedule thereunto annexed in their construction and mode of operation"?

(See stipulation and order, fols. 48–51.)

Pursuant to said order, said issues came on for trial before the Honorable NATHANIEL SHIPMAN, Judge, and a Jury, May 22, 1874, and the first and

second of said issues were tried. And after hearing the evidence, the arguments of counsel, and the charge of the judge (see fols. 128–140), said jury rendered a verdict in the affirmative in answer to both of said questions. (See fol. 141).

The respondents caused a case to be made of the pleadings, evidence, Judge's charge, exceptions taken and proceedings in said cause, with leave to turn the same into a Bill of Exceptions, and moved for a new trial of said issues thereon before the Judge before whom these issues were tried—who denied said motion. (See decision of said Court, filed September 23d, 1874; fols. 182–187.)

Shortly after the granting of such certificate by Judge SHIPMAN, a suit was brought by the first of the respondents herein, as assignee of the said John F. Barker patent, against the appellant, alleging his infringement of said patent by the manufacture and sale of gas-burners of the improvement described therein; to which the appellant herein made answer, admitting the manufacture and sale of such gas-burners, but claiming the right to do so under his said patent, denying any infringement of the Barker Patent, and claiming that the improvements described in the latter patent were his inventions secured and described by his patent, and that said Barker Patent was void for want of novelty; also claiming that it was obtained through fraud and in fraud of appellant's rights. Which cause being at issue, testimony was taken before an Examiner and completed for final hearing before the final hearing herein.

Thereupon said first-mentioned cause upon all said proceedings, with the certificate thereof of the Judge who presided at the trial thereof, and also the testimony and proceedings in the said last-mentioned suit and stipulations agreed upon (see

fols. 283-286), came on to be heard for final decree at a Special Term of said Court, held at the February Term thereof, March 5th, 1877, before Hon. ALEXANDER S. JOHNSON, late Judge of said Court, andwas duly argued before him by the respective counsel for said parties, but, before deciding the same, Judge JOHNSON departed this life.

By order made and filed February 18th, 1878, said cause, including the testimony and proceedings in said second suit, was placed upon the Calendar of said Court at the Equity Term thereof, and came on to be heard in regular order before Hon. SAMUEL BLATCHFORD, Judge of said Court, at the April Term thereof, May 15th, 1878. After argument by counsel for said parties respectively, a decision was rendered and filed October 14th, 1878, adverse to the appellant in this, that the first claim of his patent is invalid for want of novelty, and that the respondents had not infringed the second claim thereof. (See opinion, fols. 254-275.) Whereupon said decree was entered and filed herein, from which this appeal is taken. Praying that the same may be reversed upon the hearing of said cause and proceedings therein, and a decree made therein sustaining appellant's said bill.

STATEMENT OF THE EVIDENCE.

It appears from the evidence in both said suits, as the same was presented on the final hearing, that the appellant, Clough's, invention related to burners for burning illuminating gas made by saturating air with vapor of gasoline, commonly called air gas. That owing to the variable density of the gas, as it comes from the generating apparatus, the ordinary bat-wing burner was poorly adapted for consuming it. When the gas was highly charged with carbon, as it was when first turned on from the generator,

the ordinary burner exuded too much gas, and smoke was occasioned in consequence. And then, later on in the process of consumption, the gas became thinner in density and an insufficient quantity was emitted through the burner-tip, which reduced or weakened the flame.

The purpose of Mr. Clough's invention was to adapt a slitted or bat-wing burner so as to obviate this difficulty, and to so regulate the supply of gas as to secure clear and uniform light.

This he accomplished by constructing such a burner, with a fine slot at the tip, and by perforating the burner tube at or near its base with small holes, and surrounding the burner with a tube or sleeve open at the top, closed at the bottom, and united to the burner below the perforations, and in directing two currents of gas, one through the fine slot in the burner tip, and the other, when necessity required, through the perforations at the base, into the external tube, and thence to the tip of the burner.

The principle of the invention consisted in passing a second current of gas through the perforations in the base of the burner tube into the surrounding tube outside the burner, so that when there was a necessity for a greater supply of gas than would pass through the slit of the burner, a tubular jet could be projected through the outside tube upon the outside of the burner tip coming up between the burner and the tube. This tubular jet of gas would necessarily be burned under a lower pressure than the bat-wing jet, and would give volume to the flame.

When the gas was too rich and dense the perforations might be closed, and but a single current of gas used, and the fine slot in the burner tip adapted it for burning the gas in this condition without emitting smoke, but when the gas became

thinner an additional supply was needed, which was obtained by opening the perforations and allowing it to flow through them into the surrounding tube.

By this means a result was attained never known before. By the old burners in use the gas was passed directly to and burned through the open slot, whereas by the improvement of appellant two currents of gas were passed, one through the slot, which was fine, to give the flame direction, and the other through the holes at the base of the burner into the surrounding tube under lower pressure, to give it volume.

Clough's	Testimony,	Fol.	54.
Kitchen	"	"	64–68.
Nash	"	"	70–71.
Walsh	"	"	73.
Tirrell	"	"	78–79.
Maxim	"	"	83.

In the specifications to said patent the appellant describes his said improvement to consist : (Fol. 145).

"*First.*—In perforating the base of the burner tube with small holes or passages for gas to escape at the base of the burner, and surrounding the burner with a tube, open at the top, but closed at the bottom, and united to the burner below the perforations in the burner tube. It is more convenient to screw the tube to the burner, but it may be attached in any suitable manner."

"*Second.*—In regulating the escape of gas from the perforations at the base of the burner by a sliding tubular valve or cut-off, introduced into the burner tube of the base and extending upward within it, the position of the tubular valve being regulated by a screw."

"These improvements, by furnishing a regulated supply of gas outside the burner, but directed to the tip of the burner by the surrounding tube gives steadiness and increased illuminating power to the flame of the bat-wing burner, and make it a desirable burner for burning air gas."

Then follows a description of his invention and its operation by reference to its drawings. (Here is to be noted an omission in printing the record, as followe: Fol. 178½, after the words, "the adjustment of the gas escaping through the perforations of the burner screw," should be added to the words "is easily made by turning the burner upon the annular screw.") See fol. 257 in Judge BLATCHFORD's opinion, where the words are properly included in his quotation of this part of the specifications. The appellant then claims in his said patent as follows: (Fol. 146½).

"The bat-wing burner perforated at the base in combination with the surrounding tube, substantially as described."

"Also, in combination with the bat-wing burner, perforated at the base, and surrounding tube, the tubular valve for regulating the supply of external gas to the burner, substantially as described."

After perfecting his invention the appellant applied for his said patent therefor on or about December 4, 1869 (fol. 142). Pending such application, he made and sold a quantity of these burners, and some time in the latter part of the winter of 1870 he called at the office of the respondents in the City of New York, to solicit their trade for his burner, they being large manufacturers of gas burners, and left a sample with their agent, Mr. Gilbert, who promised to send it to their manufactory, at Springfield, to be tested, which was done (fol. 55). At this time said John F. Barker, the treasurer of said company, was experimenting in gas-burners to adapt them for burning gasoline gas (fols. 120, 159), and after receiving appellant's burner, constructed the form of burners (claimed to be infringements herein) and in the month of April, 1870 (fol. 219), introduced them into the market, and in May following applied for the Letters Patent therefor, which were subsequently

granted to him July 26, 1870, and numbered 105,768. In the meanwhile the appellant had called repeatedly at the office of the company to obtain some response with reference to his burner, but received no word respecting it until, as he says, the first he heard was they had a burner of their own, referring to those above-mentioned, when, having already obtained his patent, dated June 14, 1870, he showed it to them and notified them of the infringement, and to desist therefrom. (Fols. 55 and 56).

In this connection models are shown by appellant, as follows: Those marked respectively "A," "B" and "C," claimed to be covered by his patent and the improvements therein described, and "D" and "E" being the devices of the respondents' burner and substantially like "A" and "B" and claimed to be infringements of appellant's patent.

Exhibit "F," is a form of burner made by appellant in 1869, which he claims is covered by his patent, and is substantially like "A" and "B," and anticipates the respondents' burner "D." (Fols. 55, 240, 241, 243, 244, 245, 246, 247, 248, 252.)

It will be seen by reference to said John F. Barker's Patent, fols. 155–163, that the first form of burner described in his specifications corresponds with said Exhibits "A" and "B;" and the second form of burner with Exhibit "E." And also, by reference to the appellant's Patent, fols. 143–146 1-2, that "A," and "B," are embraced in the first claim thereof, corresponding with his specification No. 1; and "C" is embraced in the second claim corresponding with specification No. 2.

It was not disputed upon the trial that "A" and "B" were embraced within appellant's patent, provided they were so described in the specifications and drawings that a person skilled in the art could produce them without the aid of invention, but it

was contended by the respondents that they were not, as a matter of fact, so sufficiently described therein, and that the only burner which was described was Exhibit "C," and that Exhibit "C" was substantially different from respondents' burner in construction and mode of operation. And, it was also claimed that the appellant was not the first and original inventor of the improvement for which his patent was granted.

That "A" and "B" are sufficiently described in the specifications and drawings of appellant's patent was testified to by all of his witnesses:

Clough,	Fol.	54
Kitchen,	"	66
Nash,	"	70–71
Walsh,	"	74
McGreggor,	"	76
Tirrell,	"	78
Maxim,	"	83–84–123, 125.

This last witness also showed by the drawings, fol. 84, that the form of the flame was precisely alike in A, B, C, D and E. Three of the respondents' witnesses testified that A and B were not sufficiently described in appellant's specifications and drawings:

Gleason,	Fol.	235
Brownell,	"	112
J. F. Barker,	"	115

The others were not questioned on the point.

Upon the question of substantial identity between Exhibit "C" and the respondents' burners "D" and "E," it was contended by the appellant that the valve in the surrounding tube of "D" and "E" was a substitution of an equivalent for the tubular valve in "C," perfectly well known at the date of appellant's patent and was a mere formal

alteration of the combination, suggested simply by mechanical skill; that the location and form of the valve in this respect, whether outside or inside, were alike unimportant.

See testimony in behalf of appellant on this point:

Kitchen,	Fol.	65–71
Clough,	"	53–63
Walsh,	"	74
Maxim,	"	124
Tirrell,	"	78
Maxim,	"	84–86

Mr. Renwick, who testified in behalf of respondents, even said: "There is what amounts to a valve" in respondent's burner. (Fols. 102–107.) And Brownell, another of respondents' witnesses said: "It performs the functions of a valve." (Fol. 109.) Though claiming the structure was different.

Mr. J. F. Barker testified in behalf of respondents, to the contrary (fol. 119). Also Gleason (fol. 238). Mr. H. R. Barker was not questioned particularly on the subject.

Upon the question of priority of appellant's invention, the respondents produced in evidence a certified copy of rejected application of H. R. Barker, for improvement in gas-burners, filed Feb. 25, 1869 (fols. 147–153), and four model burners as described therein, marked F, G, H and I.

Other forms of burners were introduced, as the Coolidge burner (see description fols. 121, 222); the Frederick Lunkenheimer. (See copy of Letters Patent therefor in case No. 63 (formerly 329), fols. 121, 128, and drawings, page 63, also model for description of the same;) and the Daniel H. Solliday. (See Letters Patent therefor, case No. 63 (formerly 329), fols. 113–119 and drawings, page 60.)

But the device mainly relied upon by the respondents was the Horace R. Barker burner. It was substantially like the Coolidge burner (see fol. 123) and model shown, which had been patented (fol. 196). They both consisted of a bat-wing burner, having a peculiar shaped slot sawed down in such a manner that it could be opened or closed according to the distance that a ring is screwed down upon an upright conical projection near the tip of the burner in the Barker burner, or screwed up against an inverted conical projection near the tip in the Coolidge burner, the function of the ring being to *clamp* the slot together and prevent a leakage of gas. (Fol. 123.)

In the Horace R. Barker burner the bat-wing burner was slitted nearly to the base, and there was a screw upon the inside of the lower part of the tube. When the tube was screwed down upon the burner, the top of the tube pressed against the enlarged part of the burner near its top, and the slot was closed. When the tube was screwed up, the slit was enlarged. The respondents claimed that the top of the tube, in connection with the projecting part of the burner, formed a valve, and that the gas passed to the tip, not only through the burner but through the ring near the tip at the end of the surrounding tube, in a double current, and that the device was substantially like the burner of the appellant.

The appellant claimed that the object and effect of this invention was to provide a burner in which the bat-wing slit could be enlarged or diminished at pleasure, and to consume but a single current of gas, that the top of the tube in connection with the conical part of the burner was not a valve but a *clamp*, and when the burner was new or well made, this clamp prevented the escape of gas, and that there was no ap-

preciable delivery of gas in a well made burner except through the tip; that if gas escaped it was incidental and not desired, and in a well made burner did not and was not intended to escape. (Fol. 139.)

The evidence showed that the Coolidge burner, similarly constructed, was a failure because the result was a single sheet of flame; there was no second current of gas from the outside as in appellant's burner, although there might be leakage from the interior of the tube to the outside of the burner sleeve (see Tirrell, fol. 79), who first suggested to Dr. Coolidge the invention. Walsh says before appellant's burner was invented, it was customary to make the bat-wing burner with a large slot, to get a large volume of gas through the burner, and the rapidity of the gas going through the slot created a wavering or unsteady flame, which was a serious objection to his gas-burner. In appellant's burner there is a very fine slot, which, with the surrounding tube and the perforations at the base, produces a steady flame similar to that produced from burning coal gas, and various qualities of gas can be burned. (Fol. 73.)

Clough explains this still more fully as the purpose of his invention by means of this slot, the perforations and surrounding tube (fol, 54), and says they effected the object perfectly, and accomplished something that the gas machine men acknowledged never was done before (fol. 56), *and that it would be practicable to burn the gas by taking out the tubular valve.* (Fol. 60.)

KITCHEN testifies to the same effect (fol. 64) and considers it a very useful improvement (fol. 70).

MCGREGOR declares that appellant's burners (Ex. A, B and C), embody the same features found in respondents' burners, and differ from the gas burners in use before appellant made them, in hav-

ing a combined annular chamber and slot with perforations at the base (fol. 76).

TIRRELL to the same effect (fol. 77).

MAXIM, a thorough expert, says appellant's burner opened a new era in gas machines, and the defects which it remedied are the fatal features in gas burners (fol. 83), and shows by the drawings (see p. 74) that the flame produced by the Coolidge and H. R. Barker burners is of different shape from that of appellant's burners (fol. 84). That the object of the ring in the Coolidge and H. R. Barker burners is to *clamp* the slot together to prevent a leakage of gas; that the gas escapes through the slit with at least ten times the velocity that it does through the annulus; that the vital point in the Clough burner is that the gas comes through at two different velocities, which is shown in the drawings (fol. 123–126); that there is no annulus in any of these burners, defining an annulus to be a passage that is circular in form, while a slot is a rectangular orifice; and that the Lunkenheimer burner does not resemble appellant's burner in any manner whatever, the gas simply escapes through a slot or slit having an adjustable check inside (fol. 124); that the H. R. Barker burner operates by a *clamp* and not a valve, which exists in appellant's and respondents' burners (fol. 126); and that if gas should escape in the H. R. Barker burner, when the slot is screwed together, the form of the slot allows a much greater flow of gas than the annulus, consequently the gas would not be retarded by the leakage in coming through (fol. 127). Horace R. Barker, one of the respondents' witnesses, who is a brother of said John F. Barker, in his testimony admits the using of the John F. Barker burners since putting up his, and evaded the question whether his burner worked as well as the John F. Barker burner (fol. 91);

Gleason, another of respondents' witnesses, on his cross-examination, admits he never saw the H. R. Barker burners burn, and also, having testified on his direct-examination that the H. R. Barker and respondents' burner were substantially the same thing in use and operation, he admits, on his cross-examination, that there is no variation in the slot of respondents' burner by screwing the annular ring up and down, while in the H. R. Barker burner screwing down the ring decreases the supply of gas through the slot and annulus, at the same time claiming it would be impossible to screw the ring down so tightly as that there would be no escape of gas (fol. 96).

Mr. RENWICK, the expert who testifies for respondents, admits, on his cross-examination, that he could bring the ring down on the H. R. Barker burner so as to fully cut off an outside supply, and such was the intention and design of the invention to open and close the slot; that when it was used he had no doubt that it increased and decreased the slit as you increased or decreased the tubular flame, but after working a little, by failure of the spring, it would cease to affect it; that the inventor states in his patent the object to be, by the tube to increase or diminish the size of the slit (fol. 106); Mr. John F. Barker admits in his testimony if there be any escape of gas between the burner and the ring in the Coolidge burner it is owing to defective construction (fol. 122), and he also says that this and the H. R. Barker burner are practically the same (fol. 121).

Mr. BROWNELL, another of respondents' witnesses, testified (fol. 114), that the design of the H. R. Barker burner was to regulate the supply of gas by opening and closing the slit, whereas in both ap-

pellant's and respondents' burners there is no widening or narrowing of the slit in the regulation.

The Judge's charge to the jury, in the trial of the framed issues, is found at fols. 128, 141. And he charged as requested by the respondents in every instance, save as to the first and second preliminary requests, which were refused (fol. 128). See fol. 207, case No. 63 (formerly 329), where it is inserted, as to granting and refusing requests, this being omitted in case 64 (formerly 330), through inadvertence.

The jury having rendered a verdict in the affirmative on said framed issues, thereby determining that A. and B. were embraced in appellant's patent, and sufficiently described in the specifications, and that respondent's burners were substantially identical with appellant's burner C in construction, and mode of operation, and said appellant was the first and original inventor of the improvement for which his patent was granted, the Judge, in his opinion deciding against granting a new trial, says, in commenting upon the question of fact presented:

"I am of the opinion that the weight of evidence in this part of the case was not such as to justify me in granting a new trial. The most important question of fact in the cause was the one in regard to which the distinguished expert who was introduced by the defendant chiefly testified, viz.: Whether the complainant was the original inventor of the burner for which his patent was granted."

(Referring to the Horace R. Barker device and Mr. Renwick's testimony fol. 103.)

"* * I am of the opinion that the jury upon this question of fact did not misconceive the weight of evidence. When the verdict was rendered I thought that the jury had reached a proper conclusion upon the question of priority, and I am still satisfied with the result to which they came" (fol. 186).

The evidence adduced on the part of the G. and B. Manufacturing Co. *v.* Clough, begun after the refusal to grant a new trial in this suit, did not materially change the state of facts. The respondents offered in evidence the John F. Barker patent, dated July 26th, 1870, No. 105,768 (fols. 155, 163½), the assignment of which to said Company respondents, May 29, 1870, and the incorporation of said Company was admitted by appellant, and respondents rested (fol. 165).

The appellant Clough put in evidence his Letters Patent, dated June 14, 1870, and No. 104,271 (fols. 176, 179), and the evidence, pleadings and proceedings in the first suit, with the opinion and certificate of Judge SHIPMAN against a new trial therein, and testified as to the perfection of his invention and his application to test the same, and that the burner described and claimed in the John F. Barker patent is the same as the burner claimed and described in his patent (fols. 179, 180 and 181.) Also that he made burner like Exhibit B prior to hearing of the John F. Barker burner, and like Exhibit A in November or December, 1870; also as to the making of a form of burner put in evidence and marked Exhibit F, which is substantially like Exhibit B, in January or February, 1870, which he claims is covered by his patent and anticipated the respondents' burner (fols. 246, 252). Mr. Kitchen also testified to having seen Exhibit F in January, 1870, the same having been shown him by Clough (fols. 241, 244.) The appellant also testified as to the Horace R. Barker burner, that it was entirely different from the John F. Barker burner. That the Solliday and Coolidge burners were entirely different from his burners; in the Coolidge burners the surrounding tube was used to open and close the slit, the Horace R. Barker burner was practically the same as the Coolidge, and the Solliday burner

was simply a surrounding tube to cut off the corners of the bat-wing flame so as to be suitable for globes. (Fols. 189–191).

Mr. John F. Barker and Mr. Gleason were the only witnesses examined for the respondents in that suit, the former testifying at considerable length as to the various burners referred to in the former suit, putting in evidence the Solliday patent and Solliday burner marked "Complainant's Solliday burner, Feb. 25, 1875." Also Horace R. Barker burner, same date. Also D, John F. Barker burner, No. 5, E, John F. Barker No. 4 (respondents principally manufacturing E), Horace R. Barker burner, marked H. BB, being of better workmanship than the other, made in 1874, and identified as "Complainant's Horace R. Barker burner, Feb. 25, 1875." Lankenheimer patent W. H., also patent to Clough, dated Nov. 7, 1871, and marked "Complainant's Exhibit Clough's Patent, No. 2, W. H." And testifying to the first making of his burners about February, 1870, and on cross-examination that he applied for his patent in May, 1870 (fol. 229); that A and B are made in accordance with one of the modifications of his patent, that D is precisely the same in construction and mode of operation as A and B, E is the same in mode of operation as A, B and D, and is nearly the same in construction, and A and B are practically the same as D and E with slight exception in construction, and thereupon A, B, D and E were put in evidence as respondents' exhibits. All of them have the same form of flame when in operation; the effect of their operation is that a supplemental feed of gas is conveyed by the surrounding tube to the tip of the burner and this additional supply in all of them is furnished through perforations which allow the gas to escape from the stem or pillar of the burner into the space between that and the sur-

rounding tube and that supply in all of them increased or diminished to the extent that the perforations may be covered or uncovered, or to the extent that communication may be had between the interior and exterior of the burner pillar; and in the case of the burners A and B, D and E, the supply is effected by adjusting the female screw of the surrounding tube up and down on the male screw on the burner pillar; with the burner C, it is effected by adjusting the female screw of the burner up and down on the male screw of the tubular valve (fol. 231); that the elements in Clough's patent consist of the bat's-wing burner with perforations in the burner pillar and a tube surrounding said burner, and a tubular valve. The Solliday burner, Lunkenheimer, the Horace R. Barker burner, and the Coolidge burner, all embrace those elements. The Solliday burner having a surrounding tube and an opening through the pillar below the top of the tube when the tube is screwed up—in the Lunkenheimer burner a tubular valve, in the Coolidge burner a surrounding tube with a perforation at the base of the burner, in the H. R. Barker burner a surrounding tube with perforations at the base of the burner and a tubular valve being a part of the construction of the burner. And they equally embrace elements or parts employed in the structure of the John F. Barker burner. (Fol. 232.)

Testimony was also given as to the desirableness of a non-revolving flame on appellant's burner C, and the cheapness of respondent's form of burner over that, both by John F. Barker and Gleason.

In the main, however, the evidence raised similar questions in this to those in the former suit, involving the same burners and the same questions as to other inventions and the right to make them.

THE ERRORS RELIED ON ARE:

That the Court below awarded a decree in favor of the appellees. That decree was erroneous.

First, In that it adjudged the first claim of appellant's patent to be invalid for want of novelty.

The Court erred in deciding that the combination of said claim was found in the Horace R. Barker burner; whereas the decision should have been that the combination was not so found, and that the said claim was new and valid.

And the decree should have been in favor of the appellant as the original inventor thereof, and should have adjudged his said patent as to said first claim thereof to have been valid, and that appellees had infringed the same.

Second, In that it adjudged that the appellees had not infringed the second claim of appellants' said patent.

The Court erred in limiting the construction of said claim to the form of the interior tubular valve therein described, and in deciding that said claim is not infringed by the burners A and B, nor by any burner constructed in accordance with any description of a burner in the John F. Barker patent; whereas, the construction of said claim should not have been so limited, but should have been held to include said burners and the burners described in said John F. Barker patent, and the same should have been held to have been infringments of appellant's said second claim and of his said patent.

The decree should have been in favor of the appellant, as the original inventor and patentee of said burners and said improvement described in said John F. Barker patent, and should have adjudged that the appellees had infringed the said

claim of his said patent and that the improvements described in said John F. Barker patent were not patentable, having already been invented and patented by the appellant in his said letters patent, and the verdict of the jury upon the feigned issues should have been sustained, and the decree should have perpetually enjoined appellees from making, selling, using, or in any manner disposing of said burners and said improvement, and otherwise adjudged and decreed, as prayed in appellant's bill.

Argument.

I.

IN VIEW OF THE STATE OF THE ART, AS SHOWN BY THE EVIDENCE, AS TO THE FORM OF BURNERS IN USE OR KNOWN PRIOR TO THE INVENTION OF APPELLANT'S, THE IMPROVEMENT CLAIMED BY HIS PATENT WAS NOVEL AND PATENTABLE.

1. This is presumably the case from the fact of the issue of the letters patent to the appellant.

Imhaeuser *v.* Beurk, 101 U. S., 647-662.
Ransom *v.* The Mayor, 1 Fisher's Pat. Ca., 255.
Bates *v.* Coe, 98 U. S., 31.
Smith *v.* Goodyear Dental Vulcanite Co., 93 U. S. 486, 498.

2. It so appears, from the testimony, and by a comparison of the appellant's invention with the forms of burners referred to as previously in use.

In the Horace R. Barker burner we have a different combination in its form, mode of operation and results attained; the clamp is at the top of the burner, and was a means in connection with the shell or so called surrounding tube, of closing it or

opening it as it was operated up or down. When opened there were not two currents of gas, nor when closed, except possibly by leakage. The perforation consisted of a slit all the way down from the tip to the base, and it was enlarged by means of a screw and a clamp; and in a well constructed burner of this description there was no escape of gas when closed, and only one current in either case.

The testimony ot appellants witnesses showed that the Clough burner was a new era in air gas burners; that it supplied a long needed want; that it was a novelty and a success; that previous burners had arisen and passed away, because they had been unsuccessful, and that when Clough's burner came into use it achieved immediate success.

Clough, fol. 56;
Geo. H. Kitchen, fol. 65;
Scotto C. Nash, fol. 70;
Alonzo Walsh, fols. 73, 74;
Wm. H. McGregor, fol. 76;
Oakes Tirrell, fol. 79;
W. H. Maxim, fol. 83.

There must be some substantial reason for this. Did it rest in the novel form of the parts, or in the difference in the parts or elements of which it was composed?

By a comparison of the specifications of the Horace R. Barker burner (fols. 148, 153), with those of the appellant's Patent (fols. 144, 146½), the combination of appellant's Patent is not found therein. Nor is the structure and mode of operation of the respective combinations the same.

It is said by the learned judge in his opinion in the Court below, that the fact that this slot extended all the way up from the base of the burner to its

tip, and that the burner tube had a cone near its top made no difference as to structure and mode of operation of the combination as compared with the combination covered by the first claim of the appellant's patent. That the first claim of appellant's patent is broad enough to cover both.

The first claim of appellant's patent reads: (Fol. 178.)

"The bat-wing burner perforated at the base in combination with the surrounding tube substantially as described."

The description is:

"The object of my improvement is to adapt the slitted or bat's wing burner to the burning of air gas; said improvements consist first in perforating the base of the burner tube with small holes or passages for gas *to escape at the base of the burner*, and surrounding the burner with a tube, open at the top, but closed at the bottom, and united to the burner below the perforations in the burner tube. *It is more convenient to screw the tube to the burner, but it may be attached in any suitable manner.* These improvements," * * [referring also to the tubular valve in the second claim], "by furnishing a regulated supply of gas *outside* the burner, *but directed to the tip of the burner* by *the surrounding tube*, give steadiness and increased illuminating power to the flame of the bat wing burner, and make it a desirable burner for burning air gas." (Fol. 177).

It will be seen that these perforations were entirely separated from the slot in appellant's burner to introduce two instead of one current of gas to the flame, the respective currents being under different pressure (Alonzo T. Walsh tes., fol. 74) (Kitchen, fol. 64). And that they were so constructed for this purpose while the perforation, if it may be so called, in the Horace R. Barker burner is the slot, and but one current of gas can be admitted through it; and the purpose was to admit of but one current of gas, that current to be regulated by enlarging it through widening the slot.

An attempt was made by respondents to show by their witnesses that in this respect there was no difference between this and the appellant's burner as to the current of gas and the flame. *Mr. Renwick*, in his testimony, claimed that the slit was a hole of a different shape, but that it came to the same thing; lets gas out from the inside into the surrounding tube, and that the burner burnt with the same flame (see fol. 103); but on his cross-examination, when asked to explain why the spring in the Horace R. Barker burner did not continually press against the outside tube however high it be screwed up, said:

"The reason is very evident; this burner pillar is cast brass; after this cap has been screwed on a few times to shut up the slit, as we all know a gas burner gets intensely hot, and the little temper it ever had in it is entirely taken out, and it ceases to be a spring. I found I could bring this top down so that the ring fully cut off all outside supply, and I could not detect any variation in the size of the bat's wing."

"Q. That was the intention to open and close the slot, was "it not?

"A. It was, sir.

"Q. That was the principal design of the invention?

"A. That was the design of the invention, but I do not "say it was the principal design.

"Q. The spring failed?

"A. Yes, sir.

"Q. Here is one which I understand has been in use five "years; see if that has any such qualities?

"A. Not in its practical operation, but you will notice now that the size of the slit in the bat's wing is not at all changed, and the outside tube is so far down that you can't screw it down further; it must whether springy or not springy have always worked with the tubular flame; when it was new I have no doubt that it increased and decreased the slit as you increased or decreased the tubular flame, but after working a little it would cease to affect it."

"Q. Was not the main office of the Horace R. Barker burner, as described in this patent, to widen the slit in the bat's wing burner for the purpose of permitting a larger amount of gas to escape?

"A. He states the fact: by the use of this tube he can increase or diminish the size of the slit.

"Q. You have got a narrow slit and want to make it wider, and what he does by his invention originally designed is to widen the slit in the bat's wing burner ?

"A. He must have had the tubular flow ; you can never take a small circle and spread it out and make it fit a larger one, so he must always have had the flow outside the bat's wing burner" (fol. 106).

Making the most of this evidence for the respondents, all it amounts to is simply this, that when the burner tube did not properly come together as the barrel was screwed down upon the cone or clamp, there was an escape of gas through the slit below the cone into the barrel, and thence to the flame as a separate current, but there was no regulation about it ; it was simply leakage from malformation, the gas escaping through the whole slit, saving, perhaps, just at the point of the impingement at the cone. The practical result was an irregularity and defect in the flame—the purpose of the invention being a solid flame from a single and uninterrupted current of gas, either from the base of the burner to the tip when the full flow was on, or from the tip alone when the cone was impinged, and the slot below thereby supposed to be closed ; and there was no ring flame at the tip when the full flow of gas was on or off when the burner was properly constructed and in proper condition for burning gas. By reference to the rejected application of Horace R. Barker for his patent (fols. 148–153), and the drawing annexed, it will be seen that the design was to secure a single current of gas, instead of a double current ; and by contracting the slot to reduce the size of the flame when required, without reducing the pressure of gas. When the barrel was turned up and the full flow of gas was on, there was but a single current, and a heavy flame was produced, which was the purpose of the lengthened slot ; *whereas, when the full flow of gas was on, in the appellant's burner, there was a double cur-*

rent of gas under different pressures and a ring flame.

This matter of difference in pressure of the two currents is a very material one, as is shown by the testimony (see Maxim, fol. 126). He says:

"A steady flame cannot be produced where both jets issue with the same velocity."

And in the Clough patent this constituted a part of the *regulation*, and was a vital element in his invention.

The evidence, however, of respondents' witnesses as to the Horace R. Barker burner, was contradicted by appellant's witnesses (see Maxim, fol. 126), in this, *that the cone or clamp, when the barrel is screwed down upon the same, forms an air-tight joint, and no space exists at all in a properly constructed burner for the escape of gas save through the slot.* That there was but a single current of gas, and even if there were leakage in a defective burner of this description, which appeared to be the character of the burner he was referring to, the form of the slot allows a much greater flow of gas than the annulus, consequently the gas would not be retarded in coming through. Hence, it follows, that even when there was leakage admitting of a passage of gas around the tip of the burner, it was in no sense such a separate and independent current of gas under lower pressure than that through the tip of the burner tube, as in appellant's burner, but merely an irregular escape of gas interfering with the proper operation of the burner. Practically and really there was one current of gas, and that of uniform pressure, the regulation being the increase or decrease of that current by opening or closing of the slit. That escaping around the ring being under high pressure, while that passing through appellant's outside tube to the tip of the

burner was under low pressure, and thereby effecting a different result in the character of the flame and in luminosity.

Therefore this accidental discharge of gas as the result of leakage, is to be disregarded. It led to no understanding of the double process of burning gas as developed in Clough's invention. Those engaged in making and using the burner understood from the leakage that it was a defect, and as impairing its usefulness. And so it was, when considered in connection with the original idea of the invention. No one making or using it certainly derived the least hint from this leakage as to the practicable usefulness of the introduction of two independent currents of gas as an improved method of burning gasoline gas, as involved in Clough's invention.

Tilghman *v.* Proctor, 102 U. S., 707, 711.

As to the conical projection in the Horace R. Barker burner: its purpose being to enlarge or diminish the slot, and therefore the single current of gas introduced to the flame as the same was clamped together by the barrel, it was not needed in the appellant's burner, and does not exist there, for this reason: that the process of regulating the supply of gas is radically different in the two burners. It is used in the Horace R. Barker burner because all the gas goes through one orifice in a single current, and the supply is regulated by diminishing the length of this orifice, and therefore the single current, the office of the barrel being to widen the slot and conduct the gas in one solid current to the flame.

It is not needed or used in the appellant's burner because, in the first place, the single current of gas introduced through the burner tube at the tip is always the same. The supply of gas is not increased or diminished from this source. In the second place, the form and construction

of the burner is for the introduction of two distinct currents of gas to the flame under different pressures. The first one being from the tip of the burner through the fine slit under higher pressure, and the second one being from the base of the burner through the holes under lower pressure entirely disconnected from the outer until it meets it at the outside of the flame at the tip of the burner. And, finally, because the regulation is by the two currents under such different pressures and as adjusted by the peculiar form of the burner and tube combined. And hence by different means.

What is the combination, then, contained in the Horace R. Barker burner? A burner tube in form having a slot extending from the tip down near to the base with a conical projection near the top, with a projecting base and a flange upon which and around the base is a barrel or surrounding tube, narrowed or curved in at the top for the purpose of impinging against the sides of the conical projection and thereby closing the same and the slot as it is lowered or screwed down to the base of the burner. And if we leave off the conical projection as a regulator of the size or length of the slot, which is all the regulation there is, the combination then is a burner tube with a slot open all the way down to or near the base, with a surrounding tube curved or narrowed in at the top. What is the combination in appellant's burner? A burner in form with a short fine slot at the tip, and holes near the base, which is projecting, with a surrounding tube attached to the base and extending all the way up to the tip of the burner, not narrowed or curved in at the top, but of uniform diameter, and so adjusted as to size of slot, location, and size of the holes or perforations as to introduce two distinct currents of gas at the tip of the burner and under varying pressure; one through and out at the slot

at the tip of the burner under high pressure, and the other through and out at the holes under low pressure.

If we turn the gas on the Horace B. Barker burner with the tube open, we have a large and single current of gas flowing from the tip of the burner conveyed there by the barrel, and the barrel is itself the measure of the burner and determines the size of the flame as though it were a burner tube.

If we turn the gas on the appellant's burner, we have a double current of gas, one conveyed through the fine slot at the tip, and the other through the perforations into the surrounding tube to the tip, there meeting for the first time the exferior sides of the flow or flame at the tip.

It was just this difference in the form and arrangement of the burner and tube that enabled appellant to accomplish the result never before achieved, and which was not possible to accomplish with the form and arrangement of the Horace B. Barker burner.

The purpose of the form and arrangement of appellant's burner was to meet a difficulty in burning gasoline gas, which had never before been met.

The difficulty was to construct a burner that would burn gasoline gas under its varying density. No burner had been found that would do this. This was the problem the appellant undertook to solve. He discovered the principle that by the introduction of a separate current of gas under lower pressure than that through the tip of the burner, the difficulty could be met and overcome. And as the result of long continued experiments invented a burner with the form and adjustment of parts as described, by which this principle was rendered of practical utility, and the form and adjustment of these parts as combined is of the essence of his invention, and constitutes a new machine.

In this respect the combination of the burner and surrounding tube in appellant's first claim is to be distinguished from the burner and surrounding tube of the Horace R. Barker burner, and from all the burners, as being a novel form of these elements of such combination achieving a new and useful result not possible to be achieved by the others.

This was patentable.

Curtis on Pat. (4 ed.), pp. 118, 122, 156, 178.
Leroy *v.* Tatham, 14 How., 174.
O'Reilly *v.* Morse, 15 *id.*, 62.
Corning *v.* Burden, *id.*, 268.
Winans *v.* Denmead, *id.*, 330.
Tilghman *v.* Proctor, 102 U. S., 711; citing 15 How., 252, 257.

The mechanical processes employed in the two machines were different, and so different that by no possibility could it be said that one suggested the other, but instead the difference was the result of invention and discovery. A difference in kind, and not a mere formal difference. As has been truly said and as we shall have occasion to see further when we come to consider the subject of the second claim—of appellant's patent—as a general rule an alteration of the form, size or proportions of an existing claim is not such a change as to produce patentable novelty.

Reutzer *v.* Kanours, 1 Washington, 171.
Parker *v.* Little, 3 Washington, 198.

Enlarging or diminishing any or all of the parts of a machine or manufacture does not alter or change the principle, and hence it is not patentably novel, but there are cases in which the form is of the essence of the invention, and then the change of form may alter.

In the matter of ploughs for instance:

"A change in the form of the share land side or mould board may constitute invention, for a new effect may be produced on the soil thereby."

"If by changing the form or proportions a new effect is produced, there is not simply a change of form and proportion, but a change of principle also."

Davis *v.* Palmer, 2 Brock., 298.
Werner *v.* King, 96 U. S., 219, 230.

It will be noted that the Horace R. Barker Application, filed February 25, 1869, for Letters Patent for his burner, was rejected (fol. 147); and was practically the same invention as that for which Letters Patent were granted to John B. Coolidge, October 9, 1866 (fol. 191.)

This consisted of a bat's wing burner with a globular shaped tip and slotted down towards the base of the burner, the slot being closed by the turning up of the outside tube, so as to impinge tightly against the lower surface of the globular tip, and thereby draw the same together, the only difference being in the form of the cone at the tip (fol. 122); the slot being opened by reversing the tube, and in this way the single current of gas was increased or diminished almost or quite in the same way as in the Horace R. Barker burner, producing precisely the same kind of a flame.

See Maxim, fol. 84.
" Drawings, fol. 162.
" also Barker, fol. 122.

It was a failure (see Tirrell, fol. 79) for the reason there was but the single current of gas regulated by the opening and closing of this extended slot, as in the Horace R. Barker burner, and what has

been said with reference to that in this connection has the same and even still greater emphasis as applied to this.

The same may also be said as to the Lunkenheimer burner (fol. 130, case 329).

It was constructed with two perforations near the tip of the burner tube without the slot, around which was a tube so adjusted that the gas escaped through the perforations and down the tube and out at the base thereof into an outside shell or covering slotted at the tip, through which the gas passed to the flame in a single current, the purpose being a check. It was designed to make a thick flame.

And also as to the Solliday burner (fol. 115, case 329). It was simply a bat-wing burner slotted at the tip with a closely fitting surrounding tube adjusted so that by raising or lowering to narrow or widen the corners of the bat-wing flame rendering it suitable for globes. The slit was not adjustable and there was but a single current of gas (fol. 191).

"When the thing patented is an entirety, consisting of a single device or combination of old elements incapable of division or separate use, the respondent cannot escape the charge of infringement by alleging or proving that a part of the entire thing is found in all prior patents or printed publications or machine, and another part in another prior exhibit, and still another part in a third one, and from the three or any greater number of such exhibits draw the conclusion that the patentee is not the original and first inventor of the patented improvement."

Bates *v.* Coe, 98 U. S., 31, 48.

3. A new combination, if it produces new and useful results, is patentable, though all constitu-

ents of the combination were well known and in common use before the combination was made.

Hailes *v.* Van Wormer, 20 Wall., 353.
Washing Machine Co. *v.* Tool Co., id.,342.
Carleton *v.* Bokee, 17 id., 463.
Gould *v.* Rees, 15 Wall., 187, 189.

4. He is the first inventor who first perfects and adapts an invention to use. Crude and imperfect experiments do not confer a right to a patent.

Seymour *v.* Osborne, 11 Wall., 517.

5. An accidental combination of parts, or invention made under such circumstances that the public obtained no knowledge of the principle, or result, or effect of such combination, the parties themselves who made it not understanding such principle, does not constitute invention. The invention is not made until the parties contriving, or those observing, discovered how it can be made available for the particular purpose.

Ransom *v.* The Mayor, 1 Fisher's Pat. Cas., 252.
Telghman *v.* Proctor, 102 U. S., 711.

6. The novelty of a combination can only be destroyed by showing that all the elements thereof had been used together before and in the same relation to each other.

Yale, &c., Mfg. Co. *v.* North, 3 Fisher's Pat. Cas., 287.
Swift *v.* Whisen, id., 357.

II.

THE IMPROVEMENT CLAIMED BY THE APPELLANT'S PATENT ANTICIPATED AND INCLUDED THE ARRANGEMENTS AND IMPROVEMENT CLAIMED BY RESPONDENTS' PATENT.

1. This is true as to the first claim of appellant's patent, whether considered alone or in conjunction with means of regulation.

a. Irrespective of regulation, the combination of the surrounding tube with the burner having the orifice and perforations described for the uses and purposes named, was a new and useful improvement originally invented by the appellant as claimed by him, and in these particulars is precisely like the form of burner described in respondents' patent, and made and sold by them as alleged in the bill of complaint.

It introduced two currents of gas to the flame at the tip of the burner. See points above.

b. When considered in connection with regulating the supply of gas, this is equally the case, because the construction being such that the two currents of gas passing to the orifice of the burner, one directly through the burner to the tip, and the other through the perforations into the surrounding tube and thence to the flame, was, of itself, a regulation securing an effect not previously known or ascertained, and was the result of long continued experiments, amounting to invention and discovery.

The orifice in the top of the burner was so constructed, when taken in conjunction with the form and position of the perforations in the base of the burner and the surrounding tube, as to practically obviate the difficulties that had previously existed

in all other burners relative to burning gasoline gas, in consequence of its varying density. This was regulation, and is none the less so because the regulation was by fixed and unvarying instrumentalities.

There were two currents of gas supplied from these sources, their relative force and volume being adjusted (though fixed) by the dimensions and form of the orifice or tip on the one hand, and the perforations and surrounding tube on the other, in such proportions as to produce an effect not previously attained, and to amount to an invention, as shown in the foregoing point. In this respect there is a difference between this and the second claim of the patent.

c. This combination contained in the first claim taken as an entirety, comprised of itself a new machine, accomplishing the new and useful result described, never before achieved, and therefore was a new invention, the exclusive property to which was secured to appellant as the patentee thereof. No one could make, use or vend it, nor could any one makes use or vend a machine containing it without infringing.

Curtis on Pat. (4 ed.), §§ 111 *a*, 317–320.

This is true, whether said claim be considered in connection with regulation or not.

d. This claim of appellant's patent is confessedly found in the claim of appellees' patent. The fine slit at the tip of the burner is found therein; the peculiar shape and location of the perforations are found therein, and likewise the surrounding-tube, and, as combined with the other elements; *and the burner constructed by the appellees would be valueless without it.* They simply revolve the sur-

rounding-tube of appellant's combination up and down the screw-thread cut on the outside of the burner-stem at its base, and by which the tube is attached to the burner-stem, and by this process of revolution open and close the perforations in the burner-stem, and thereby let on or shut off the second current of gas.

The only difference that can possibly be claimed by appellees between their burner as claimed by their patent, and a burner constructed according to the first claim of appellant's patent, is simply this means of letting on or shutting off the current of gas passing through these perforations ; in all other respects the burners are precisely alike.

The prime element therefore of appellees' burner is the combination or machine constructed according to the first claim of appellant's patent.

This constitutes infringement of such first claim.

Having discovered the principle, and specified the practical method of its application in his patent, this is all that is required.

Curtis on Pat. (4 ed.), § 245.

e. The first claim of appellant's patent when taken in connection with the specifications and drawings thereof, as it should be, accurately describes and anticipates the claim of respondent's patent —including the mode of letting on and shutting off the second current of gas through the perforations (fols. 176, 178)—and from the same a skilled mechanic could make a burner in form and operation precisely like the respondents.

(See fols. 54, 66. 70–71, 74, 76, 78, 83, 84, 123, 125.)

Specification first in appellant's patent reads—after describing the burner-tube and surrounding-tube

"It is more convenient to screw the tube to the burner, but it may be attached in any suitable manner." (Fol. 177.)

This, taken in connection with the principle of the invention, which was the introduction of the second current of gas through the perforations into the surrounding-tube to the flame, for the purposes named, renders perfectly obvious the idea of regulation as to this second supply of gas, so that when the gas was too dense for the double current none should escape through the holes, and when the gas was too thin for the single current the additional quantity required might be allowed to flow through the holes into the surrounding-tube to the flame. (Op. SHIPMAN, J., Fol. 184.)

And any good mechanic, acquainted with the construction of burners, with appellant's patent before him, could have no difficulty in constructing therefrom the form of burner like those described and claimed in appellee's patent.

Ives *v.* Hamilton, 92 U. S., 426.

"In construeing patents it is the province of the Court to determine what the subject matter is upon the whole face of the specification and accompanying drawings."

Bates *v.* Coe, 98 U. S. 31, citing—
Brooks *v.* Fisk, 15 How., 215, and
Curtis on Pat. (4 ed.), § 222.

They are to be construed liberally, and not to be subjected to a rigid interpretation.

The nature and extent of the invention claimed by the patentee is the thing to be ascertained.

Curtis on Pat. (4 ed.), §§ 225, 229.
Also *ibid*, p. 170, *note*.
Klein *v.* Russell, 19 Wall., 433, 436.

2. As to the second claim of appellant's patent, this contains the combination included in the first claim in connection with the regulating valve, whereby the supply of the current of gas is still further regulated, that is to say, by means of the tubular valve the supply of gas through the perforations is lessened or entirely cut off, as may be required, so that a single current of gas only, whenever that is all that is required, may be supplied, and that by passing through the burner to its tip. And it is claimed that this mode of regulation by the tubular valve so called anticipates and includes the mode of regulation as claimed and described in the respondents' patent.

This will more clearly appear from a careful analysis of the parts used in each.

Limiting the description of appellant's burner to the combination as shown by Exhibit C, what is the difference between this burner and respondents' burner as shown by Exhibits D and E? Each is a bat-wing burner; each has the same perforations through the burner tube, in similar proportions; around each there is a tube screwed to the burner; the only practical difference, if any, consists in the means by which the current of gas through the perforations is cut off. When the full force of both currents of gas is on they act precisely alike and produce exactly the same results. And so when the current of gas through the perforations is partially or entirely shut off the result as to the supply of gas, mode of burning and form of the flame and amount of luminosity secured, is precisely alike in each burner.

The only difference between the appellant's and respondents' burners, then, being limited as to the manner of regulating the supply of gas through these perforations into the surrounding tube, let us examine into the manner of such regulation as to each: And—

First.—As to Exhibit "C," conceded to be made exactly in conformity to the second claim of appellant's patent, we find on examining it, that the regulation is by what is called a tubular valve. The tubular valve consists of a hollow cylinder or tube fitted to the inside of the burner tube, the lower end of which is screwed to the gas pipe and around the upper part of which the burner revolves, and by means of a screw thread on the outside of the tubular valve, fitted to a corresponding screw thread on the inner side of the burner tube, which burner tube is made by such revolution upon the screw thread to raise or lower upon the tubular valve so as to open, when raised, or to close, when lowered, the perforations on the inside the burner tube, thereby letting on or shutting off the supply of gas through these perforations. When the burner is screwed or turned entirely down, the tubular valve on the inside of the burner tube covers the perforations, and so fits the inside of the burner tube as to permit of a single current of gas through the burner to its tip as in the case of an ordinary bat's wing burner. And when the burner is being screwed or turned up, the tubular valve lowers to the extent of partially or wholly uncovering the perforations so as to admit of a double current of gas as desired, one through the burner to its tip, and the other through the perforations into the surrounding tube and to the flame at the tip of the burner.

Second.—As to "D" and "E," the respondents' burner, as made according to the respondents' patent, we find, on examining these exhibits and the improvement as claimed in this patent, that the regulation is by revolving the surrounding tube which is screwed to the outside of the burner tube up and down upon the screw thread cut on the outside of the burner tube, with a corresponding screw thread

on the inside of the base or lower part of the surrounding tube, where it is attached to or comes into contact with the burner tube. The turning or screw down of the surrounding tube (in one form) lowering the same below the perforations cut through the upper part of the screw thread on the outside of the burner, so as to admit of the current of gas through the perforations into the surrounding tube and thence to the flame or tip of the burner. And the turning or screwing up of the surrounding tube on the screw thread raising the same so as to close the perforation and shut off, partially or entirely, as may be desired, the current of gas into the surrounding tube through these perforations, and admit of but a single current of gas, and that through and out of the burner tube at the tip of the burner, as in the ordinary bat-wing burner. Also (in another form) by turning or screwing up the surrounding tube on the screw thread, so as to lift the part thereof resting and fitting closely upon the shoulder of the burner tube, through which the perforations are made, instead of through the screw thread, and in this way admit of the current of gas through the same into and through the surrounding tube to the flame, and the turning or screwing down of the surrounding tube so as to fit tightly upon the shoulder and over the perforations, and thereby reduce, or shut off entirely, such supply of gas into the surrounding tube, leaving only a single current of gas through and to the tip of the burner tube, the regulation in either of these forms of respondents' burners being the same.

Is there any real difference betwen the appellant's burner "C" and the respondents' burner "D" and "E," in the manner of regulation? Is not the instrmentality by which this regulation is accomplished the same in each instance?

In Exhibit "C" the tubular valve is the male screw, around which the burner tube revolves as the female screw, and by this process of revolution the supply of gas through the perforations into the surrounding tube is let on or shut off as required.

In Exhibits "D" and "E" the tubular valve, or that which amounts to the same thing, and is the equivalent of a tubular valve, is the female screw, and the burner is the male screw, around which the female screw revolves, and by this process of revolution the supply of gas through the perforations into the surrounding tube is let on or shut off as required. In the one case the regulation is accomplished by turning the burner, and in the other case by turning the valve or its equivalent; the valve and the surrounding tube in the latter case being contained in one piece, serving both the purpose of a valve and a surrounding tube, and as the female screw, letting on and shutting off the gas through the perforations by turning up and down on the male screw, operating not only as a valve but as a tubular valve, the same as in Exhibit "C," where the tubular valve operates as a male screw, letting on and shutting off the gas through the perforations in the burner, as the female screw turns up and down on the male screw, only the action being reversed in the latter case from the former. It is true, in the latter case the burner revolves and the valve remains fixed, while in the former the burner remains fixed and the valve revolves; but this does not change the true or real nature and character of the invention or improvement. It is also true that in the latter case (Exhibit "C") the burner is composed of three pieces, if the surrounding tube be simply screwed to the burner, as it may be. And in the case of the respondents' burners "D" and "E," the burners are composed of two pieces; but if the surronnding tube be soldered to Exhibit

"C," then it is composed of only two pieces, but here again the nature of the parts and the offices they fill respectively, or the functions they perform are such that the character of the invention is not changed by this circumstance.

A closer analysis of the various parts of these burners only serves to more clearly demonstrate this, and to show that the respondents' burner is really the burner invented by appellant in every element and particular, the only difference being the reversion of its parts by the respondents, the result of mechanical skill, and not of invention.

Take Exhibit "C," and separate it into its parts and what do we have? A burner tube with an orifice constructed for burning gasoline gas, and with holes or perforations at or near its base, with a screw thread cut on the inside for the purpose of revolution, or turning around the tubular valve upon a screw thread cut on the outside thereof for that purpose. And a surrounding tube screwed to the outside of the burner tube just below the perforations; also the tubular valve. With the exception of the tubular valve as a separate piece, we have precisely the same pieces in form and construction in Exhibits "D" and "E," that is to say, we have the burner tube with the perforations and surrounding tube screwed to the outside thereof beneath the perforations, there being no screw thread on the outside of the burner tube for a tubular valve, but one for screwing the same to the gas-pipe to which it is or may be attached. With these exceptions, these parts of the respective burners are precisely alike. Suppose now we take the burner tube of Exhibit "C," and remove therefrom the tubular valve and the surrounding tube, and construct a burner tube precisely like it, leaving out the inside screw thread for the tubular valve, we then have what is called

a bat-wing burner, with perforations at or near the base. Suppose now we construct a tubular valve precisely like the other, but of sufficient diameter to pass around the outside instead of the inside of the burner tube, with a screw thread cut on the inside of the tubular valve to fit upon a corresponding screw thread cut on the outside of the burner tube, around which the tubular valve so constructed is to revolve, and by revolving to raise and lower up or down and around the burner tube, covering or uncovering by the process of revolution the perforations. Now, if we attach to the outside of this tubular valve, either by screwing the same to the valve or making it a solid part thereof, the surrounding tube, we have a burner precisely like Exhibits "D" and "E" in construction and form and mode of operation. The burner tube is made stationary by being screwed to the gas-pipe, and the tubular valve, which surrounds it and revolves up and down upon the screw thread with the surrounding tube, opens and shuts the perforations by which the supply of gas through the perforations into the surrounding tube is let on or shut off and thus regulated, as in Exhibits "D" and "E." The valve and surrounding tube are in effect, and may be, in fact, if the surrounding tube be made solid with the valve—one piece—just as they are in Exhibits "D" and "E," and in respondents' patent. Wherein is there any new element introduced or left out in Exhibits "D" and "E" that is not in Exhibit "C"? They both contain exactly the same parts in the same form and operate in the same manner, producing the same result, only the action in the one case is the reverse of the other. In Exhibit "C" the burner, having the surrounding tube attached, revolves up and down the tubular valve, which is attached to the gas-pipe; and in Exhibits "D" and "E" the tubular valve, having the surrounding

tube attached, revolves up and down the burner tube which is attached to the gas-pipe; this process of revolution in both cases operates to let on or shut off the supply of gas through the perforations into the surrounding tube, and in both cases this regulation is effected by the same form of burner tube, same form of tubular valve, save in dimensions, and the same form of surrounding tube, and in both cases the results accomplished by the regulation are precisely alike—only in the one case the flame revolves and the other it does not. As is readily seen this revolution of the flame results from no new element or part of this burner in Exhibit "C" that is not found in "D" and "E." but merely from the fact that the tubular valve is attached to the gas-pipe instead of the burner. If we attach the burner instead of the tubular valve, which we are enabled to do by simply increasing the diameter of the latter and placing it on the outside instead of the inside of the burner tube, then we have a fixed burner tube as in Exhibits "D" and "E," with the tubular valve revolving on the outside, and in both instances a fixed flame. So in both instances the flame could be made to revolve by fixing the tubular valve to the gas-pipe instead of to the burner tube, and constructing the latter to revolve up and down the tubular valve which surrounds the outside of the burner tube.

In Exhibits "D" and "E" that part of the surrounding tube, which comes in contact with the outside of the burner tube and revolves around the same upon the screw thread, is none the less a tubular valve because it is made part of the surrounding tube. As has already been shown, if a tubular valve, like Exhibit "C," be so constructed by enlarging its diameter as to encircle the outside of the burner tnbe instead of the inside, and by means of corresponding screw threads on the

outside of the burner tube instead of the inside, and on the inside of the tubular valve instead of the outside, made to raise and lower so as to cover and uncover the perforations in the burner tube, and to this tubular valve the surrounding tube be attached and be made a solid part of the same, there would be no difference in mechanical construction between such tubular valve and the surrounding tube operating as such tubular valve in respondents' burners, Exhibits "D" and E." Suppose that part of the surrounding tube in Exhibits "D" and "E," coming in contact with the outside shell of the burner tube, were divided vertically into two parts or sections, the inner part or section containing the interior screw thread, corresponding to the screw thread on the exterior of the burner tube, and a smooth cylindrical surface on the outside, and the outer part or section, containing a smooth, cylindrical surface on the inside, corresponding to the like surface on the outside of the other section, and containing the surrounding tube on the outside as now existing, the inner section would be a tubular valve corresponding to our tubular valve put on the outside instead of the inside of exhibit "C," and the outer section would be the surrounding tube corresponding to the surrounding tube to be placed on the outside and around our tubular valve when placed exterior and around the burner tube in exhibit "C." Now, if we place the outer section upon the inner section of exhibit "D" and "E," we have the tubular valve between the burner tube and the surrounding tube, just as we would if the tubular valve in exhibit "C" were placed, as stated, around the outside of the same, and the surrounding tube attached to the same instead of the burner tube. And if these sections in exhibits "D" and "E" are made one, we then have a tubular valve and surrounding tube,

combined just as we would in exhibit "C," if the tubular valve as placed on the outside of the burner tube and the surrounding tube attached to the same were made in one piece.

It sufficiently appears, from the foregoing, that the real and only difference between exhibit "C" and exhibits "D" and "E" is not in the parts or elements of which they are composed or the form of those parts, but in the arrangement or the mode of placing them. Exhibit "C" contains the tubular valve, the burner and surrounding tube, the tubular valve being placed inside the burner, and the surrounding tube being attached to the outside of the burner tube. Exhibits "D" and "E" contain the same parts, *i. e.*, the valve, the burner and the surrounding tube, the valve being on the outside instead of the inside of the burner tube; this necessitates attaching the surrounding tube to the valve instead of to the burner tube, and, in this way, the regulating action or process is reversed, *i. e.*, the burner is fixed and the valve revolves, instead of, as before, the burner revolving and the valve being fixed. By this change in the arrangement of appellant's burner, the valve is placed between the surrounding tube and the burner tube, while in exhibit "C" the burner tube is between the valve and surrounding tube. The surrounding tube being part of the valve in exhibits "D" and "E" and part of the burner tube in exhibit "C."

Is this modification of the adjustment of parts the result of mechanical skill or invention in the eye of the law, the parts being almost exactly the same, and the only difference being the order in which they are placed and the only effect being a reverse action in the mode of regulation?

From the foregoing analysis, we think it is clear that the mode of regulating the supply of gas

through the perforations by the surrounding tube, being made to turn upon the screw thread, and thereby open and close the perforations as in exhibits "D" and "E" cannot be called an invention, as distinguished from the mode of regulation by the tubular valve in exhibit "C," for if that part of the surrounding tube in exhibits "D" and "E" coming in contact with the burner tube should be divided from the other so as to be in two parts or sections as stated, we would then have the tubular valve of exhibit "C" on the outside of the burner tube instead of the inside, and the surrounding tube attached to the valve instead of the burner. If we should then fasten solidly together the two sections of "D" and "E" thus divided, so as to make them one piece, we would have the tubular valve Exhibit "C" on the outside of the burner tube and the surrounding tube attached to it so as to form one piece; we would also have Exhibits "D" and "E" as now constructed. In other words, Exhibits "D" and "E" are constructed precisely the same as to regulation as appellant's burner would be if the tubular valve were placed outside the burner and the surrounding tube attached solidly to it instead of being attached to the burner.

Is not that part of Exhibits "D" and "E" coming in contact with the burner tube a tubular valve with surrounding tube made solid to it? The ablest of all respondents' experts pronounced "that it amounted to a valve." (Fol. 102.)

It being a valve, is there any difference whatever between it and the tubular valve of "Exhibit "C" placed outside of the burner tube with the surrounding tube attached to it instead of the burner tube? If it is not such a tubular valve, is it not a mechanism equivalent to it, the one the equal if not the counterpart of the other?

That being so, there is no invention by respondents in the construction of Exhibits "D" and "E" in this respect, for they are constructed according to the invention secured by the Letters Patent of the appellant.

Is there any invention in the mere matter of placing the valve or its equivalent on the outside instead of the inside of the burner? Clearly not, for no change is wrought in this regard other than that of reverse action in regulation; by this transposition the valve is made to revolve around the burner instead of the burner around the valve as in appellant's Exhibit "C."

"Authorities concur that the substantial equivalent of a thing in the sense of the patent law is the same as the thing itself; so that if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, though they differ in name, form or shape."

Mach. Co. *v.* Murphy, 97 U. S., 120, 124, 125; citing
Cahoon *v.* Ring, 620.
Curtis on Pat. (4 ed.), sec. 310.
Many *v.* Jaggard, 1 Blatchf., 372.
Gray *v.* Osgood, Peters, C. C. R., 394, 398.

"Mere change of form in a machine or its parts does not destroy the substantial identity of the parts changed if such part still performs the same duty or function as before; and it must not be supposed that because one machine looks entirely unlike another, that therefore they are substantially different."

Simond's Manual Pat. Laws, p. 23.

"One machine is the same in substance as another, if the principle be the same in effect, though the form of the machine be different. Thus in Boville *v.* Moore (Dav. Pat. Cases, 361,402), GIBBS, C. J., said, 'I remember that was the expedient used by a man in Cornwall who endeavored to pirate the steam engine. He produced an engine which on the first view of it had not the least resemblance to Boul-

ton & Watts' Engine; where you looked for the head you found the feet, and where you looked for the feet you found the head; but it turned out he had taken the principle of Boulton & Watts'; it acted as well one way as the other, but if you set it upright, it was exactly Boulton & Watts' engine. So here I make the same observation, because I observe it is stated that one acts upwards and the other downwards; one commences from the bottom and produces the lace by an upward operation, the other acts from above and produces it by an operation downwards; but that if the principle be the same, must be considered as the same in point of invention.'"

Curtis on Pat. (4th Ed.), § 308:
See also Imhauser *v.* Beurk, 101 U. S., 647, 663.

3.—The original inventor of a device or machine has a right to treat as infringers all who make a machine operating on the same principle and performing the same functions by analogous means or equivalent combinations, even though the infringing machine may be an improvement of the original and patentable as such.

McCormick *v.* Talcott, 20 How., 405.
Case *v.* Brown, 2 Wall., 320.
Simonds' Man'l Patent Law, 29, and cases cited.
Burr *v.* Duryea, 1 Wall., 531.
Planing Mach. Co. *v.* Keith, 101 U. S., 479, 489.

4.—A mere carrying forward of an original conception already patented—a new and more extended application of it—involving change only of form, proportions or degree, the substitution of equivalents doing the same thing as did the original invention by substantially the same means with better effects, is not such invention as will sustain a patent.

Smith *v.* Nichols, 21 Wall., 112.

Nor is mere cheapness in construction patentable, nor material to this inquiry.

Curtis on Pat., 4th ed., §73.

5.—Where one has discovered a principle and a mode of carrying it into effect, and obtained a patent therefor, if any one afterwards takes the principle and the mode substantially, though he varies the form, he is an infringer.

Leroy *v.* Tatham, 14 How., 174.
O'Reilly *v.* Morse, 15 Id., 62.
Corning *v.* Burden, Id., 268.
Winans *v.* Denmead, Id., 330.
McCormack *v.* Talcott, 20 How., 402.

6.—The substitution of a known equivalent for one of the elements of a former structure is not patentable, and is an infringement of the former.

Cranch *v.* Roemer, 103, U. S., 797.
Imhaeuser *v.* Buerk, 101 Id., 647.
Water Meter Co. *v.* Desper, Id., 332, 335.

7.—If any one of the parts of a patented combination is only formally omitted and is supplied by a mechanical equivalent, performing the same office and producing the same result the patent is infringed.

Water Meter Co. *v.* Desper, 101 U. S., 332.

It follows, therefore, that respondents' Exhibits "D" and "E" and improvement described in his Letters Patent were not patentable, having already been invented and patented by the appellant. They are only changes produced by mechanical skill and not such as involve invention.

III.

THE VERDICT OF THE JURY UPON THE FEIGNED ISSUES WAS, ACCORDING TO THE EVIDENCE, PROPERLY ADMITTED, AND SHOULD HAVE BEEN SUSTAINED AND FINAL DECREE ENTERED THEREON ACCORDINGLY.

1. This sufficiently appears from the foregoing points.

2. Respondents' exceptions to the evidence were untenable; and the evidence was properly admitted in every instance excepted to.

   See Exceptions, Fols. 52, 57, 65, 74, 76 and 85.

3. The witnesses were duly qualified to testify upon the matters inquired of; and the evidence was competent for the jury under the issues before them, and they were not misled thereby.

   1 Greenleaf on Ev. (12 Ed.) § 440, citing Webber *v.* Eastern R. R. Co., 2 Metc., 147; Id., § 440, *a*.

4. The respondents, claiming that they have substantially departed from the appellant's burner in form, have the burden of proof to show that it is such a departure as involves invention and not mere mechanical skill, in order to escape the charge of infringement. This they failed to do.

   Curtis on Pat. (4 Ed.), p. 395.

5. Respondents' exceptions to the refusal of the Judge to charge the jury as requested by them were also untenable.

The Judge charged in every instance as requested by the respondents, but two (see fol. 128); and the questions involved in these two requests were otherwise properly submitted by him to the jury under the issues. It would have been error for him to have charged in the terms as requested.

6. A verdict upon feigned issues should not be disturbed, unless it be for palpable and material errors, and no such errors have been committed.

IV.

THE DECREE OF THE COURT BELOW SHOULD BE REVERSED, AND A DECREE MADE HEREIN SUSTAINING APPELLANT'S BILL AND GRANTING THE PRAYER THEREOF.

ROGER H. LYON,
For Appellant.

OFFICE SUPREME COURT U. S.
FILED
OCT 30 1882
JAMES H. MCKENNEY, CLK.

16466

The Supreme Court of the United States.

No. 64.

OCTOBER TERM, 1882.

THEODORE CLOUGH,

Appellant,

vs.

THE GILBERT & BARKER MANUFACTURING COMPANY, JOHN F. BARKER AND CHARLES N. GILBERT,

Appellees.

BRIEF FOR APPELLEES.

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(Law Telephone No. 541.)

1882.

Supreme Court of the United States.

THEODORE CLOUGH (PLAINTIFF BELOW),

Appellant,

agst.

THE GILBERT AND BARKER MANUFACTURING COMPANY, JOHN F. BARKER AND CHARLES N. GILBERT,

Appellees.

STATEMENT.

This is an appeal from a final decree (p. 129) of the Circuit Court of the United States for the Southern District of New York. In the court below, issues were framed and tried before a jury, and a verdict on them rendered for the appellant. Before the application for a final decree had been made, the parties had taken further evidence in the cross suit (No. 63), and that evidence was by consent and without exception used on the final hearing before Judge Blatchford in this suit (p. 130). There are thirty-five pages of that evidence, and it is in this record between pages 88 and 122. This evidence, which was not before Judge Shipman or the jury, enabled His Honor Mr. Justice Blatchford on the final

hearing to understand clearly the exact state of the art at the date of Clough's application for his patent, which the jury had utterly failed to understand.

Judge Blatchford's opinion is at p. 122. On the final hearing, the facts, as distinguished from opinions and inferences, were substantially undisputed, and the issues turned on the question of the correct construction of appellant's patent. His Honor, Mr. Justice Blatchford, differed from the jury, and from Judge Shipman, who presided at the jury trial and gave the appellant's patent a narrow construction, instead of one sufficiently broad to cover the gas burners made by appellees and described in the Barker patent.

The state of the art at the date of appellant's invention is fully set forth on pages 89–111.

It appears that air gas or gasoline gas is a compound formed by the mechanical mixture of common air with vapors of volatile hydro-carbon oils and the proportions of the mixture vary under different temperatures, the mixture containing at times more or less carbon; when containing too large a proportion of carbon the gas is said to be rich, and then gives a smoky light; when it contains too small a portion it is said to be poor, and then gives a pale thin light (pp. 89–90). Gasoline gas is made by simply passing a current of air over the surface of gasoline. The air takes up a portion of the gasoline, and the product is gasoline gas ready for use.

Coal gas is carbureted hydrogen produced by the destructive distillation of coal, the union between the carbon and hydrogen being chemical. Coal gas is practically non-condensable under ordinary temperatures. It is known as a fixed gas of even quality (*id.*).

Gas machines for making illuminating gas from benzole, one of the products of petroleum, were first introduced in this country about 1853 to a very limited extent, and for making gas from gasoline, another product of petroleum, more generally about 1860 (p. 90).

The burners in general use for coal gas were the common bat's-wing burner and the common Argand burner. These burners were applied to gasoline gas at the time of its introduction, and are both still largely used in certain classes of

property, and for such are to this day preferable to any other burners. Argand burners still furnish a steadier and stronger light than any other burner, and are now extensively used for gasoline gas in dwelling-houses, stores and public buildings (*id.*).

Common bat's-wing burners are still more desirable than any others in large factories. In a large factory, with three hundred burners, for example, if adjustable burners were used, there would be three hundred burners to be adjusted, and some portion of the valuable time of the three hundred workmen using them would be spent in adjusting them, and when they were in the power of the operatives to adjust, such workmen would often burn more gas than was necessary. In such cases the common bat's-wing burner is used, and one man makes it his business to regulate the supply of gas by a cock in the main gas-pipe. Under this method all the adjusting is done by a single man, and only as much gas as is necessary is consumed (*id.*).

There were, however, serious objections to both of these descriptions of burners. The Argand burners required a glass chimney, easily broken and troublesome to keep clean, and which was expensive.

The inconvenience in private residences of adjusting the supply of gasoline gas in the main gas-pipe in the cellar or elsewhere, as well as the desirability of obtaining the best light possible from the open burner, led to various improvements.

Before the introduction of gasoline gas, a Mr. Daniel H. Solliday, of Philadelphia, made a very considerable improvement on the ordinary bat's wing coal gas burner, by surrounding it with "an adjustable ring band or tube closed at the bottom and open at the top." It was made to adjust by raising and lowering the surrounding tube for the purpose of controlling and directing the flow of gas (foot of p. 90). The burner had an ordinary bat's wing. It had an external screw on the enlarged portion of the pillar. It had a tube having an internal screw, which screwed down on the pillar by means of the external screw before described. Its operation was as follows: "When the surrounding tube was screwed down to its shoulder, then the gas passed through the full slit of the burner. When the surrounding

tube was raised, *it covered a portion of the lower part of the slit*, which had the effect of narrowing the flame. The *gas from that part of the slit which was below the top of the tube* escaped *into the surrounding tube*, and passed upwards and united with the flame which had escaped from the slit *above* the tube, and the effect was to thicken the flame, and thus increase the light" (p. 92, fol. 139). It was proven that the thickness of the flame should depend upon the quality of the gas burned; for instance, a gas of a very high illuminating power should be burned from a very narrow orifice, or, in other words, the flame should be thin, while with gas of a poor quality, say of twelve-candle power, the flame should be much thicker, in order to give the most economical result from the amount of gas burned (p. 92). The operation of the Solliday burner was to regulate the thickness of the flame. The thickness could be increased or diminished by raising or lowering the surrounding tube. In case a poor quality of gas was used in the burner, if the tube was turned upward the flame was narrowed and the gas which escaped from the lower part of the slit of the burner acted as a supplemental feed to the flame, thereby thickening it and increasing the light (p. 92 and middle of p. 95). When this tube was screwed up there were two currents of gas passing on to the flame; one current passing in a straight line up the interior of the burner stem and out of the centre of slit into flame, and the other passing out of the bottom of the slit, but below the top of the surrounding tube, at right angles to the stem, into the surrounding tube and thence up with lessened speed, and falling in a ring on to and thickening the bat's-wing flame.

These burners were in quite general use 20 years ago, and were an improvement on the bat's-wing burner (top of p. 93).

In 1866, Dr. Coolidge, of Boston, obtained a patent for an adjustable gas burner. That burner had a surrounding tube which moved up and down on a bat's-wing burner, which burner had a globular tip with a slit *extending to its base*. If the tube was moved upward its top impinged against the lower side of the burner tip, which had the effect to cut off any communication between the burner and the tip. It also had the additional effect to contract the orifice of the tip to a greater or less extent as the tube was turned up. When the tube was fully turned up the burner operated as

an ordinary bat's-wing burner; if it was turned down the slit resumed its natural position, and communication was also opened from the burner pillar below the top of the tube to the tip of the burner. The result of moving the tube down as described was to thicken the flame of gas, first, by allowing a greater volume to escape from the tip, and second, by *permitting a supplemental feed to pass up in the tube from the base of the burner to the tip* (p. 105). When the surrounding tube was screwed down away from the globular tip, two currents of gas passed to the flame with different velocities, the current passed up the centre of the burner stem out of the tip into flame. The other passed out through the split burner stem along its whole length into the surrounding tube, whence, with slackened speed, it was pressed out in a ring on to the bat's-wing flame. The current passing external to the burner stem from the surrounding tube was much greater in volume in this burner than in the Solliday burner, because the slit in the stem was of so much greater length, and this burner was an improvement on the Solliday burner in this respect.

In 1868, Horace R. Barker made adjustable burners for burning gasoline gas. In his burner the slit was extended to the base, and it had a cone on the top of the pillar. It also had a surrounding tube which could be raised or lowered. If the tube was turned downward, its top impinged against the upper side of the cone, thereby cutting off communication between the burner and the tip, and also causing the orifice of the burner to contract. If the surrounding tube was turned upward, its top ceased to impinge on the cone, the slit of the tip resumed its natural position, and gas passed from and above the base of the burner stem into the surrounding tube, and up through it to the burner tip. When the tube was in the last named position, a supplemental feed of gas passed from the base of the burner up through the surrounding tube and out at its top, where it mingled with the gas which was escaping from the tip, and resulted in thickening the flame and increasing the light. This supplemental feed was always distributed from all parts of the circumference of the top of the burner tube alike, and at the point where it united with the gas which was escaping from the top of the burner was

shown by a circular ring of flame (p. 105). The operation of this burner, therefore, when the surrounding tube was screwed up so as not to impinge on the cone, was to convey at the same time two streams of gas at different velocities to the burner tip. One current passed up the interior of the burner stem, and the other passed at a slower rate of velocity through perforations at its base into the surrounding tube exterior to the burner stem, and thence up the surrounding tube to the tip. The burners were in evidence (p. 93).

It was after all of the above-named improvements had been made in burners, and at this stage of the art, that Clough appeared (1870), with his alleged improvement. His specification is at page 68. He does not show in his specification that he knew what had been done by Solliday or Coolidge or Horace R. Barker, and does not refer to or claim an improvement on either of their burners, but claims an improvement on the old slitted or bat's-wing burner, and claims an adaptation of it to the burning of air gas (top of p. 68). He was so ignorant of the state of the art (p. 22, fol. 61), that he had not seen either of these burners at the date of his patent.

He specifies his improvement as consisting 1st, in perforating the base of the burner tube with small holes for gas to escape at the base of the burner-stem, and surrounding it with a tube open at the top and closed at the bottom, and united to the burner below the perforations in the burner-tube, and 2d, in regulating the escape of gas from the perforations, by a sliding tubular valve or cut-off introduced into the burner tube, and extending upward within it, the position of the tubular valve being regulated by a screw. He claims first, the bat-wing burner, perforated at the base in combination with a surrounding tube, substantially as described, and second, in combination with the bat-wing burner perforated at the base and surrounding tube, the tubular valve (68). In appellant's specifications and drawings he definitely and accurately describes the form and construction of exhibit C, and he describes no other form or construction. On the jury trial the appellant was called as a witness, and was shown two gas burners marked A and B, which were made by him, and was

asked if they were the articles for which his patent was taken out. The appellee's counsel objected. The court overruled the objection, and plaintiff's counsel excepted (p. 17). The witness said yes, and that they were *made subsequent to the article Exhibit C, upon which he obtained his patent* (*id.*). The appellant's counsel offered A and B in evidence; the defendant's counsel objected to their admission; the court overruled the objection, and defendant's counsel excepted (p. 20, fol. 57). They were handed to the jury *as the burners patented by complainant*, at the same time that D and E were handed to them, which last were conceded to be the burners which were patented by defendants (*id.*).

The witness testified that none of the burners, A, B or C, were now made, but their manufacture was wholly discontinued (p. 21, fol. 59, and top of p. 23), because he had invented and patented a cheaper burner (p. 23, fol. 62).

Appellant called Mr. Kitchen, a *gas-fixture* manufacturer not a *gas-burner* manufacturer, who testified as to the differences between A, B and C, taken altogether and the previous burners. He was then asked the differences between A, B and C, and D and E. Defendant's counsel objected, that A and B were not made in conformity to appellant's patent; the court overruled the objection, and defendant's counsel excepted (foot of p. 24).

On *cross-examination*, the witness was asked to read from the specifications the description of burner C, and he read from that part of the specification commencing "Fig. 2, a view showing a surrounding tube," &c. (p. 25).

He was then asked to do the same in regard to Exhibit A, and he read the same words (p. 25). He said the form of construction of A was different from C (p. 25); that C had an internal tubular valve, and A had not (*id.*).

Appellant's counsel then called Mr. Nash, a dealer in agricultural implements, and formerly a secretary of a rival company (p. 26). He was asked the difference between the set A, B and C, and the defendant's burner (foot of p. 27). He conceded a difference in construction, none in effect (*id.*).

Appellant's counsel then called Mr. Walsh, who was a rival manufacturer of gas machines (p. 28), not a manufacturer of burners.

He also testified as to the similarity of A, B and C, as a

set, to defendant's (p. 29); he conceded a difference in mechanical devices (*id.* fol. 74).

He was asked, as an expert, whether A, B and C were made in accordance with the specifications in complainant's patent.

The defendant's counsel objected that the witness was not shown to be a competent expert; the court overruled the objection, and defendant's counsel excepted (foot of p. 29).

The appellant's counsel then called

William McGregor, a superintendent of a rival gas-machine company. He was asked the stereotyped question in relation to the similarity of A, B and C with D and E.

The question was objected to as to A and B, and overruled, and defendant's counsel excepted (p. 30).

The appellant's counsel then called

Oakes Tirrill, another rival gas-machine maker (p. 30), who was asked the usual question as to A, B and C, and D and E, and he first said there was not a particle of difference between A, B and C, and D and E, in construction, mode of operation and effects produced (foot of p. 31 and top of p. 32). He afterwards admitted that A and B had a considerably different form of construction from C; that the Coolidge burner had a tube surrounding the burner stem; that there was a perforation in the stem allowing the gas to escape from the interior of the burner stem to the outside of the burner stem, and thence in the tube to the tip, and that the place or part of the perforation in the burner stem was unimportant (pp. 32, 33).

The complainant's counsel then called

Hiram S. Maxim, another rival gas-machine maker. He said Exhibit C was *identical* with the one described in Clough's specification (p. 34, fol. 83), and that A and B differed in mechanical construction from C (top of p. 35).

That C was more expensive to make than D and E. That

it was an advantage in Mr. Barker's burner over Mr. Clough's burner that the flame was not made to revolve when it was regulated (middle of p. 35). The witness was asked whether Mr. Clough's new burner was not so constructed that it could be made cheaper than Mr. Clough's original burner. The question was objected to, the objection sustained and defendant's counsel excepted (p. 35). The witness was asked whether A and B were constructed in accordance with the specifications in Clough's patent. He answered: "The form of B is the same, *but has not all the features of Mr. Clough's patent*, not so much of it" (p. 36). That it was the same in principle, but *not* in detail (*id.*). Complainants' having rested—

The appellee's counsel then called

Horace R. Barker, of Lowell, Mass., a large manufacturer of steam, water and gas goods, who produced several burners made at his shop, in Lowell, in 1868, and which had been in constant use there until he took them off to bring with him to the trial (pp. 36, 37, and middle of p. 38).

He described their construction and practical operation (p. 37).

He applied for a patent in 1869, and his application was rejected (p. 38). He testified that the burner worked practically just as well as the John F. Barker burner (p. 39), but was more expensive to make.

Appellees then called—

Elliot P. Gleason, the largest gas-burner manufacturer in the United States; twenty years in the business; acquainted with all burners; a practical mechanic and expert (p. 39). He stated that the Horace R. Barker burner was substantially, in *operation and effect*, the same as the Clough burner (middle of p. 40), different in construction.

Appellees' counsel then called—

John F. Barker, a practical mechanic of great experience (p. 52), who testified that defendants had never made any

of the particular form of Exhibit D except for experiment (p. 43); that they made them like Exhibit E (*id.*); he was at work, off and on, for three years in making the defendant's burner before he perfected it (pp. 52, 103); that there was no description in Clough's patent which would enable him to make defendant's burner (foot of p. 52); that, as matter of fact, when he invented his burner he was at work for two weeks exclusively on that with a man at a lathe, making experimental burners (*id.*); that his burner was cheaper than Clough's (foot of p. 53), and cheaper than the Horace R. Barker burner (p. 55), and better in degree (*id.*).

That all the parts of all the burners taken separately were old at the time of Clough's invention (p. 103, 104).

That he used the Horace R. Barker burners in 1868 (middle of p. 53). He describes appellants' burner (pp. 54 and 96, 97); appellees' burner (*id.*, and p. 98, 99); and Horace R. Barker burner (p. 105).

He regarded the Horace R. Barker burner as a different device from his, and Clough's as a different device (middle of p. 55). But that they give, practically, the same results (*id.*). He describes the Coolidge burner (foot of pp. 55, 56). He says, on cross, that, in his opinion, Coolidge accomplished, in fact, something more than he contemplated when he made his invention (middle of p. 56).

Appellees then called—

Henry B. Renwick, expert. He saw all the burners in practical operation, and was entirely familiar with gasoline gas (p. 43).

He pointed out the precise points of agreement and of difference in the three burners, C, D and the Horace R. Barker burner, with mathematical accuracy and precision (pp. 44, 45, 46).

He declared the effect and practical operation of appellant's, appelles' and Horace R. Barker's burner—" so far as the shape of the flame produced and the capacity of cutting off and regulating the hollow cylindrical jet of flame was concerned "—to be exactly alike (middle of p. 46).

In the appellant's burner and in the appellees' burner

"the flames are both alike" (p. 45). The Horace R. Barker burner burns with the same flame as the other two, when in the same condition. He had all three burning at once (*id.*). "The burner described in Clough's patent, the defendant's burner and the Horace R. Barker burner, are all burners which have a bat's wing, which have holes through the burner tubes below the bat's wing, and which have an enclosed tube around the bat's wing, and they will *all burn with the same kind of flame. In those respects all the three burners are exactly alike*" (middle of p. 46).

"Clough's burner has a tubular valve through which "all gas passes. That tubular valve does not exist "either in the defendant's or the Horace R. Barker "burners. The Horace R. Barker burner has a valve "which is part of the outside tube moved up and down "on the bat's wing. The defendant's burner has a valve "which is in fact the outside tube the same as the other "one, and which opens and shuts by moving up and down, "as the Horace R. Barker burner does.

"So far as their operation is concerned, irrespective of "mechanical devices—I mean, so far as the effect in the "shape of the flame produced, and the capacity of cutting "off and regulating the hollow cylindrical jet of flame is "concerned, the three burners are exactly alike. The only "difference is in construction" (p. 46.) The witness further said, in answer to the court: "A and B are substantially "like D and E" (middle of p. 47).

That in his opinion burner B would contain the invention set forth in the first claim, but not the invention set forth in the second claim, and that burner C contained both. That in his opinion A and B are *described* in complainant's patent, *so far as the first claim is concerned.* That he did not consider the tubular valve as a material part of the first claim, but he did as a material part of the second claim (p. 47.) "If I "should make a burner like the second claim, I should have "what is set up in the first claim. It is not my business to "express an opinion as to the validity of the first claim; that is matter of law" (*id.*).

Appellee then called

Isaac A. Brownell, a thorough expert, familiar with air-gas, and who had personally tested all the burners (p. 48). His description of similarities and differences in the burners was the same as Mr. Renwick's (pp. 48, 49). All the elements of the burners were old and well-known at the date of complainant's patent (foot of p. 49). Appellees' burner was cheaper than appellant's burner.

That the defendant's device performed the functions of a tubular valve, but was not *the* tubular valve which complainant describes, but "is more like a molasses gate" (p. 49).

"It is a different structure than that element, which is a "very essential one, so pronounced in complainant's patent, "and so seen by any one who looks at it. That tubular "valve is entirely wanting in this (defendant's) device—does "not exist there" (*id.*).

"The Horace R. Barker burner I examined. I put it myself upon a suitable testing pipe connected with this air-gas, and tested them myself—tested them in connection with three other burners. I tested them all upon one pipe, one after the other, and by each other; there seems to be *no difference in result*" (*id.*).

"I consider the valve of the Horace R. Barker burner and of defendant's burner different from complainant's valve."

"I do not find in complainant's specifications and drawings any description of burners like these defendants make. I find a certain structure described minutely and particularly, and the description agreeing with the drawing. The whole scope of the specification seems to be limited to what is shown in the drawing, the construction and the order of arrangements—and there is no intimation that it is susceptible of any other construction or arrangement. I don't find Exhibits D or E described in the specifications" (foot of p. 50).

"Q. Do you find any burner described there except the burner mentioned in the last claim, of which Exhibit C is a correct representation?"

"A. I do not" (*id.*).

Cross-examined:

"Mr. Brownell, you said that the defendant's burner had no interior tubular valve like the one in letter C, but that it had a mechanism that operated in the same manner?

A. Served the purpose of a valve.

Q. Is not the only difference this; that in the one the valve acts on the outside, and in the other on the inside of the bat's-wing tube?

A. *The structures are different: one is not adapted to the other* (p. 51).

Q. You say you don't find in the complainant's specifications and drawings the burner described which was made by the defendant; I will call your attention to the testimony of Mr. Renwick, and see if you don't find a part of it described there; state how much of that burner you find there in the first or second part of defendant's claim?

A. I don't find it in the first claim.

Q. Do you find in the complainant's patent there any specification, drawing, or description of a bat's-wing burner perforated at the base?

A. In the description I find it; yes, sir.

Q. Do you find anything there about that bat's-wing burner being surrounded by a shell or tube?

A. It is surrounded by *a* shell or tube, but not *that* one.

Q. Please point out the difference?

A. *This surrounding shell or tube on Ex. C don't have anything to do with the regulating device at all.*

Q. Do you not find it surrounded by a shell or tube screwed on it?

A. Yes; but I don't find it surrounded by *the shell* or *tube* in the specification.

(Mr. Yeaman reads from specifications.)

Witness: You might solder that shell on Exhibit C, but you can't solder the other one on; that specification says 'it may be attached in any suitable manner;' that shell on Exhibit D could not be soldered on there and perform all the functions of that kind without changing its whole construction.

Q. You never saw these burners in operation, did you?
A. I have; all of them.
Q. You did, since you came here?
A. Since I came here, and before" (p. 51).

Redirect-examination:

Q. "Are the specifications in complainant's patent sufficient to enable a skillful mechanic to make a burner like the defendant's burner (foot of p. 51)?

A. He could not without further invention."

Complainant's witness Maxim admitted that Exhibit C was made precisely in accordance with the specifications in Mr. Clough's patent (p. 57). That A and B were a portion of them made in accordance with his specifications, and a portion of them were not (*id.*).

He says that burner B is identical with Mr. John F. Barker's burner, except shorter (p. 57). It is to be observed that Clough did not make such burners as A and B until *after he had obtained his patent* (p. 17), and probably not until he saw those made by Barker. Barker's patent was issued July 26, 1870, and that of Clough June 14, 1870 (p. 80, 76).

Maxim admits that he would probably have to explain Clough's drawings and specifications to a mechanic before he could make a burner like defendant's burner (top of p. 58). He said the different velocities of the gas in the burner stem and the surrounding tube to which he attached great importance, was not shown in the specifications, though he claimed it was in the drawings (p. 58).

He first admittted that the Horace R. Barker burner had as much of a valve as defendant's burner (p. 58), but finally concluded it was only a clamp (*id.*). He substantially admitted that that clamp or valve was equivalent to the one on defendant's burners (p. 59). The principal difference between the Horace R. Barker and the defendant's mode of regulating the external supply of gas, he admitted, arose from the form of the slot, as he claimed the annular or round hole was better (*id.*).

The court charged the jury that if they believed that each of the several elements of the combination contained in the patent of appellant, were old and

well known at the date of his patent, then the complainant was entitled to a patent only for the particular arrangement of the said elements, which is described in his Letters Patent, and if the particular arrangement and construction of the elements in defendant's burners is not described in complainant's Letters Patent, defendant was entitled to a verdict (p. 61, and see the rulings in Record No. 63, p. 107).

The court further charged that the combination recited in the second claim of the complainant's patent, did not consist of every combination of a bats-wing burner perforated at the base, with a surrounding tube and a valve of every description, but of the particular combination of a bats-wing burner, perforated at its base, surrounding tube and tubular valve described in said patent (Record No. 63, p. 106).

The court further charged that if the defendant used a bats-wing burner, perforated at the base a surrounding tube, and a valve, tubular or otherwise, and that these three are combined together in a manner substantially different from the manner in which they are combined in complainant's patent, then the verdict as to the second claim must be for the defendant (*id.*, p. 107).

The court futrher charged that the alleged improvement specified in the second claim of the patent, is a combination of three instrumentalities, first: A bats-wing burner perforated so that the gas can pass from its interior to its exterior; secondly: A tube surrounding the burner in such manner as to receive the gas from the perforations of the burner, and open at the top; and thirdly: An adjustable tubular valve for regulating the supply of gas (*id.*, p. 106).

The court charged the jury that the invention of complainant related to an improvement in burners for burning air gas (this Record, p. 62).

The court charged that the alleged improvement which is specified in the first claim of complainant's patent is a combination of two instrumentalities merely; first, a bats-wing burner perforated in such manner as to permit gas to pass from the interior to the exterior; and second, a tube surrounding said burner in such manner as to receive the gas from the perforations of the burner, and also open at the top (Record No. 64, foot of p. 105).

The court left to the jury the question whether the burners made by defendants were described in complainants specifications and drawings (this Record, p. 62, fol. 134).

The court left to the jury the question whether (assuming that Exhibits A and B were found by them to have been described in these specifications) the burner *C*, embraced confessedly in the second claim of complainant, and described in the specifications and drawings, was substantially identical with those made by defendants (p. 64), telling the jury "that in order for the defendants to infringe upon *C*, they must use the whole combination, which they had not done in form, or they must use the same methods substantially as the complainant," and that a mere change of form, the adaptation of some equivalent theretofore known suggested by mere mechanical skill, would not prevent the burner from being an infringement, "that if the change was one of substance, and requiring the exercise of inventive power, it would not be an infringement (*id.*), and instructing the jury that if *A* and *B*, were substantially identical with *C*, then defendant's burner was an infringement of complainant's patent (*id.*). On the question of the anticipation of complainant's patent, the court charged that if the jury believed the second claim of the complainant's patent, was anticipated by the Horace R. Barker burners, then they must find that the first claim was also anticipated because the combination set forth in the first claim made a part of and was included in the second claim (Record No. 63, p. 111, fol. 218).

The court further charged, that if the jury found that the burners made by defendants have a valve which is the mechanical equivalent of complainant's tubular valve described in his specification, they would not on the evidence be warranted in refusing to find that the Horace R. Barker burner has a valve which is also the mechanical equivalent of complainant's tubular valve, and in that case the defendants would be entitled to a verdict (*id.*).

The court further charged that if the jury believed that the Horace R. Barker burner contained the entire combination contained in complainant's burner and operated in sub-

stantially the same way and with the same practical result, defendants were entitled to a verdict, and that it was immaterial that in the Barker burner the slit could be opened closed and could not be in the other (*id.*, fol. 219).

The court further charged that the difference in the fi ness or coarseness of the slit in the tip of the burner-ste of complainant's burner and the Horace R. Barker burn was immaterial (*id.*).

Also the shape of the perforations in the burner-ste was immaterial, and their location, so long as they are so shaped and located as to admit of gas passing from the inside of the burner-stem to the annular space between the burner-stem and the surrounding tube (*id.*). That the question was whether the change which Mr. Clough made was a change merely of form, a substitution of a hole for a long slit, whether it introduced a new mode of operation or accomplished an effect not before produced. That it was necessary that the Clough burner should be sustantially and materially different from the Horace R. Barker burner, involving some new idea in its construction not found in these (*id.*, p. 110).

POINTS.

First.—The court below committed no error in refusing to enter a decree against appellees, notwithstanding the verdict of the jury was adverse to them.

I.—Feigned issues are directed simply for the purpose of informing the conscience of the court on the matters in controversy, and if on a comparison of the verdict with the evidence given on the trial it is against the weight of evidence, or if the court is not satisfied with the verdict, or if any exception to the ruling of the court which the court can see prejudiced the party, was well

taken, the court will not make a decree against the party against whom the verdict was rendered.

2 *Daniels Chan, Pr.*.. 4*th., Am. Ed., p.* 1121 *to* 1123.

Stace vs. *Mabbott*, 2 *Vesey, Sr.*, 552.
Cohen vs. *Gratz*, 4 *Penn., L. J., p.* 52, *Grier, J.*
Apthorp vs. *Comstock*, 2, *Paige's Chan.*, 482, 489.
Van Alst vs. *Hunter*, 5, *Johns Ch., p.* 148.
Foote vs. *Silsby*, 1 *Fish. Pat. R., p.* 357.
Day vs. *Hartshorn*, 3 *Fish. Pat. Cases, p.* 32.
Garsed vs. *Beal*, 92 *U. S. S. C.*, 684, 695.

II.—The jury were deceived and made to believe that Exhibits A and B were in fact described in the specifications and drawings of appellant's patent. While it is a matter of mathematical demonstration by a comparison of them with the specifications that they were not therein described.

No reissue could have been obtained by Clough.

R. R. Co. vs. *Mellow*, 104 *U. S.*, 112.
James vs. *Campbell*, *id., p.* 356.

The question of the identity of an invention described in a patent with a mechanical device in evidence is one of law for the court whenever it can be determined solely by a mere comparison of the two without the aid of extrinsic evidence to explain terms of art or to apply the descriptions to the subject matter. There were, in this case, no terms of art to explain and no necessity of evidence to apply the description to the burner.

Wenzel vs. *Reid* (*id., p.* 737).

It should be observed here that the question was not whether burners made like our specifications infringe, but *whether* the form and construction of *such burners were described in Clough's specifications.*

This error of the jury was a fatal error, as A and B were like Exhibit D, which was the appellee's burner and exactly described in the specification of appellee's

patent, which was subsequent to the patent of appellant.

The jury having erroneously adopted this conclusion, no question of infringement was left. The jury simply compared D and E, which were *admitted to be appellee's burner's*, with A and B, which were precisely like D, instead of comparing them with C, as they ought to have done.

III.—The court at the jury trial erred in permitting appellant and his witnesses to testify against appellee's objection, that Exhibits A and B were made in accordance with the specifications and claim in his patent (p. 17 foot. of p. 24). The specifications were in court, and A and B were in court, and it was perfectly plain that A and B were not described in them; and it would make no difference in Judge Blatchford's opinion, if a thousand gas machine makers should swear that in their opinion they were described in the specifications, for any one who would take the trouble to make the comparison of the specification with the burners A and B in evidence could see that they were not described either in the specification or drawings.

IV.—The court at the jury trial erred in permitting Alonzo T. Walsh to express his opinion to the jury, that the Exhibits A and B were made in accordance with the specifications and drawings in appellant's patent, and appellee's exception was well taken (p. 29).

The witness was not even an expert, and knew nothing of mechanics or drawings. He was neither a practical nor a scientific mechanic (p. 28). The only qualification of the witness was that he had been four years secretary and treasurer of a corporation for making gas *machines*, not gas burners. He had not for a long time previous to the trial read the specifications in regard to which he gave his opinion (top of p. 29). The court below at the final hearing *saw by actual inspection* that the burners A and B were *not* made in accordance with appellants' specifications and drawings.

On well settled principles of law, the admission of his testimony was fatal to the verdict, and no decree could justly have been founded or verdict rendered on such evidence, because, without that evidence, the verdict *might have been* the other way.

Allen vs. *Blunt*, 3 *Story's C. Ct.*, 742.
Brooks vs. *Jenkins*, 3 *McLean*, 432, 447.
1 *Greenleaf on Evidence, Section* 440, *and Notes.*

V.—The court at the jury trial erred in permitting the witness McGregor to testify in respect to the burners A and B, upon the assumption that they were made in accordance with plaintiff's patent when the patent showed the contrary. This misled the jury, and the exception at middle of p. 30, was well taken.

The court here can see that the burners were not in fact made in accordance with the appellant's specification and drawings.

VI.—Upon the undisputed state of the art, the jury erred in five respects:

1st. In finding that the appellant was the first and original inventor of the invention recited in the first claim.

2d. In finding that the appellant was the first and original inventor of the improvement recited in the second claim.

3d. In finding that appellee's burner is described in appellant's specification and drawings so clearly and exactly and sufficiently, that it could be made from such specification.

4th. In finding that appellee's surrounding tube operated as a tubular valve like that described in appellant's specification and drawings, but that the Horace R. Barker surrounding tube, which operated in pre-

cisely the same way, did not operate like appellee's tubular valve.

5th. In finding that appellee's regulating device was a known equivalent of appellant's tubular valve, while there was either no evidence whatever that appellee's regulating device was ever known before, unless it was to be found in the Horace R. Barker or Coolidge or Solliday burners, while if it was so found there it cannot be denied that it anticipated appellant's patent.

Second.—The decision of the case turned upon the construction of appellant's patent.

The second claim in the patent is a claim for the gas burner, described in the specification and drawings, of which Exhibit C is a correct representation.

The first claim claims the part of the gas burner like Exhibit C, which remains after the internal tubular valve or regulating device is taken out.

Garsed vs. *Beal*, 92 U. S. S. C., 684, 695.

Third.—In view of the state of the art proven at the hearing, the first claim is void and may be disregarded.

That claim is for "The bats-wing burner perforated at the base in combination with the surrounding tube substantially as described."

It is impossible to give this first claim so narrow a construction as to save it. Everything in the first claim was old and well known at the date of appellant's patent.

There is not a new idea or suggestion in it.

Bats-wing burner stems or pillars were old; tubes sur-

rounding the pillar were old. Perforations in the base of the burner pillow were old. It, of course, makes no difference whether the perforations were higher or lower in the burner stem. So the experts testified (p. 45), and no one contradicted them. So Judge Shipman charged the obstinate jury (foot of p. 65).

The old Solliday burner contained *to a certain degree* the entire combination recited in the first claim. It had a burner stem. It had a bats-wing slit in the burner stem. It had a tube surrounding the burner stem. When the surrounding tube was screwed up to a certain point, then, the gas escaping from the *uncovered portion of the slit*, burned in bats-wing form, and that escaping from that part of the slit below the top of the tube formed a *supplemental supply* which *thickened* the bats-wing flame and also *burned in circular form around the base of the bats-wing*, precisely as in the Clough burner (see Barker's testimony, pp. 94, 95).

See Solliday burner.

This Solliday burner is, therefore, a bats-wing burner, perforated at or above the base in combination with a surrounding tube, and it contains, *in substance*, what constitutes the first claim in the Clough patent. The difference in the operation of a burner constructed in accordance with Clough's first claim and the Solliday burner, is one of *degree* only. In both, the bats wing sheet of flame, is thickened by a supplemental supply of gas, both furnish a supplemental ring of flame around the sheet of flame (*Id.*).

The Coolidge burner also contains the combination recited in the first claim. It has a bats-wing burner, perforated at the base. It is slitted to the base. It has a surrounding tube. Its operation is, when the tube is moved up so that its top nearly reaches the conical projection just below the tip, that a passage is open from the exterior of the burner stem to the bats-wing sheet, and the effect is, by means of the exterior supplemental supply, to thicken the sheet of flame and to produce a circular flame around the sheet (p. 105), which is the only result claimed by any one for the Clough burner.

This burner to be sure contains *something more* and may

be made to do *something more* than the Clough burner; it contains a slit nearly the entire length of the burner pillar, and the Clough burner has no such slit; by screwing up the open topped *surrounding tube* of the Coolidge burner, the slit may be closed, while no such effect is produced by screwing up the open Clough *burner*. But all these matters are immaterial on the question under consideration, which is, *whether the Coolidge burner contains what is recited in the first claim* of Clough's patent, and it is immaterial, whether it contains more. The question in another form, is whether the Coolidge burners do not infringe the first claim of Clough's patent. It is perfectly plain that they do.

The Horace R. Barker burners also contain the combination recited in the first claim of Clough's patent. They contain a bat's-wing burner, perforated at the base. The burner stems of these burners are slitted to the base, and they contain a surrounding tube closed at the bottom and open at the top. The operation of this burner is that when the surrounding tube is screwed down so as nearly, but not quite, to impinge upon the cone of the burner stem, a supplemental supply of gas passing out of the side openings in the burner stem passes at a slow velocity out at the top of the surrounding tube, and the effect is to thicken the flame sheet and form a ring of flame around it. This tube, like the Coolidge tube, can be made to open and close the burner slit, while the Clough tube cannot be made to do it, but, as we have seen, *this is immaterial on the point under consideration.*

This burner contains, therefore, the entire combination recited in the first claim.

What new idea or contrivance can be pointed out in this first claim? Clearly none.

The court should have directed the jury that the first claim was void in accordance with the request of plaintiff's counsel (p. 59).

The jury should have found, under the instructions of the court, that the first claim was void, as Judge Blatchford did find on the final hearing (see first request, p. 65, and ruling top of p. 66).

There was no dispute in respect to the state of the art and

no dispute of fact. It was clearly proved, and not in any way disproved, that the Solliday, the Coolidge and the Horace R. Barker burners had been made and used long prior to Clough's alleged new discovery (pp. 32–37, 93, 94). If it be claimed that by screwing the Coolidge burner up to a certain degree, or by screwing the Horace Barker burner down to a certain degree, the external supply of gas is entirely cut off, we answer that *the same result follows by screwing the Clough burner entirely down on the tubular valve.*

Now, in view of the state of the art, it is impossible to give the first claim of Clough's patent so narrow a construction as to save it, which, of course, can only be done by excluding from it the combinations which are contained in the anterior Solliday, Coolidge and Horace R. Barker burners.

Is the difference between plaintiff's combination and the anterior combinations to be found in the fineness of the bat's-wing slit in the burner tip? The answer is that there is not a word in the specification or the claim, or the drawings of plaintiff's patent, on the subject. And the court, at the trial, expressly charged the jury that that made no difference (p. 65). Is the difference to be found in the circumstance that, when in certain positions, the top of the Horace Barker and Coolidge burner tubes press against the burner stem and decrease the width of the slit, while this is not the case with the Clough burner, the slit in that burner always remaining the same? The answer is that in the Coolidge and Barker burners there are positions of the tube in the operation of the burner, when the increasing or decreasing of the supplemental supply does not enlarge or lessen the slit.

Is the difference to be found in the shape or in the location of the perforations in the burner stem? The answer is that there is nothing said in the specification as to the shape of the perforations, and their locality is the same in the Coolidge and Horace R. Barker burners as in complainant's burners, to wit: *at the base* of the burner stem. The court also correctly charged that the shape and location were immaterial (p. 65).

Is the difference to be found in the surrounding tube? Surely not, as far as the first claim is concerned. The Solli-

day, the Coolidge and the Horace R. Barker burners are made so that the surrounding tube may be screwed up and down on the burner pillar; but it is dangerous ground for the appellant to take to say that for this reason the Solliday, Coolidge and Horace R. Barker burners do not infringe, because the John F. Barker surrounding tube, made by defendants, may be screwed up and down on the burner pillar, and for the same reason that burner would not infringe the appellant's burner. It is pointed out above, that it is immaterial that the prior burners referred to contain *something more* than is contained in Clough's first claim, provided they contain *what is covered* by that claim. The learned Chief Justice said in the refrigerator case of Roberts *vs.* Ryer (91 U. S., 150), that an inventor of a machine is entitled to the benefit of all the uses to which it can be put, no matter whether he had conceived the idea of the use or not (p. 157).

It is submitted that the undisputed state of the art proves and demonstrates that the first claim is void for want of novelty. There is in it no new idea, no new principle, no new mode of operation, and the first claim is broadly for a bat's-wing burner perforated at the base in combination with a surrounding tube. This was Mr. Renwick's view, although it was not competent for him to say so in words (pp. 44, 48), and this was the view of Judge Blatchford (p. 127).

Fourth.—In view of the state of the art proven at the hearing, the second claim of complainant's patent is void for want of novelty.

The claim is for a bat's-wing burner perforated at the base in combination with a surrounding tube and tubular valve.

If this claim is to be construed broadly so as to include *every* bat's-wing burner perforated at the base in combination with *every* surrounding tube and *every* tubular valve,

then the claim is anticipated by the Coolidge and Horace Barker burners.

Washing Machine Co. vs. *Tool Co.*, 20 *Wallace*, 342, *and see page* 351.
Carlton vs. *Bokee*, 17 *Wallace*, 463, 466.

It has been clearly shown above that these burners contain the combination recited in the first claim, and the second claim is the combination recited in the first claim, with the addition of the internal tubular valve described in the specifications and drawings.

Now, Mr. Clough and his witnesses state that the surrounding tube or sleeve of appellee's burner, so constructed as to open and close the perforations in the burner pillar, is the equivalent of his, Clough's, tubular valve, which, when the burner is moved up and down on the valve, operates to open and close the perforations in the burner pillar. Clough states that they are substantially the same (p. 82).

Plaintiff's witness Kitchen testifies in effect that the sleeve of the plaintiff's burner operates like, and is the equivalent of, the tubular valves of the specification (p. 24 and foot of p. 25).

Plaintiff's witness Walsh testifies that there is no practical difference in the construction of plaintiff's and defendant's burners (p. 29, fol. 74).

Defendant's witness Maxim says the burners are practically the same (pp, 34, 35).

It being proven by the plaintiff's own witnesses that a surrounding tube, closed at the bottom and open at the top, made to close and open the perforations in the burner-stem by screwing it up and down, is the equivalent of plaintiff's tubular valve in the heart of the burner-stem, which operates to open and close the perforations in the burner-stem by turning the *entire burner* around upon the tubular valve, it follows, as the night the day, that the Horace R. Barker surrounding tube (which operates to open and close the perforations in the burner-stem by screwing it up and down, and which operates, when not quite screwed down upon the cone, to furnish an exterior supply of gas in a ring around the sheet, is *also the*

equivalent of the plaintiff's tubular valve, and, therefore, the Horace R. Barker burner, infringes the second claim as clearly as does defendant's burner. The court so charged the jury upon the trial (p. 65, and top of p. 66).

The suggestion that Mr. Horace R. Barker did not intend to make the burners operate as they do, because he does not state in his specification that when the surrounding tube is not screwed down closely on the tip, that a ring of gas passes out at the tip of the burner and burns around the sheet of flame from the tip, is wholly immaterial. The question is not what Mr. Barker *intended*, but *how his burners in fact operated*. He had no patent, but his *burners* had been in undisputed public use for years. It was a case of prior use.

See *Roberts* vs. *Ryer*, *supra*.

The question here is not one of invention, but one of construction and operation. And it is not a question admitting of two opinions when carefully considered, for the burners are in court, and they show for themselves.

There can be no reasonable dispute as to their operation. Mr. Renwick and the late Mr. Brownell, both accomplished experts, testified as to their operation from personal observation. Mr. Renwick says that the operation of the three burners—the Horace R. Barker and John F. Barker burners, and the Clough burner—is exactly alike. "I mean so far as the effect in the shape of the flame produced, and in the capacity of the cutting off and regulating the hollow cylindrical jet of flame is concerned, the three burners are exactly alike" (p. 46).

Mr. Brownell testified that he tested them all upon one pipe, one after the other, and there seemed to be no difference in the result. That by easing the end of the outer tube from the projecting portion of the Horace R. Barker burner, that same circular flame made its appearance, and affected the bat's-wing in the same degree (p. 49).

As no one who ever saw the Horace R. Barker burners used, contradicted the testimony of these distinguished experts, and as the burners were produced in court, so that the court could *know* from actual inspection, that the testi-

mony was true, we submit, that before the date of appellant's invention, burners had been made and used for years containing substantially the combination set forth in appellant's second claim. As to the weight exhibits are entitled to as against mere opinions see *Seymour* vs. *Osborne*, 11 *Wallace*, 517, 559.

There was, therefore, no novelty set forth in plaintiff's patent, and the patent is void.

Smith vs. *Nichols*, 21 *Wallace*, 112.
Roberts vs. *Ryer*, *supra*.

Plaintiff surely has no property in the idea of conveying two streams of gas, one in the burner stem and one out of it to the burner tip. That had been done before. Yet that is the precise supposed novelty upon which plaintiff endeavors to sustain his patent.

See testimony of Kitchen (pp. 23, 24, 25).
Also testimony of Walsh (p. 29).
Also testimony of Tirrell (p. 31).

Mr. Clough in his patent does not intimate that he had ever seen or heard of the Horace R. Barker burner or the Coolidge burner or the Solliday burner, and he only claims an improvement, not upon these, but upon the common bat's-wing burner, and he says "the object of my improvement is to adopt the fish-tail or bat's-wing burner to the burning of air gas." (See specification, p. 80).

Fifth.—The contention of the plaintiff that *his patent* was intended to and does cover the burner described in appellee's specification and drawings cannot be sustained, because if that was the patentee's intention, he is chargeable with a fraud upon the public, inasmuch as he has failed in his specification and drawings, filed in the Patent Office, "to give such a written description of his invention and of the manner and process of making, constructing and using it in such full, clear, concise and exact terms as to enable any

person skilled in the art to which it appertains to make, construct and use the same; and because he has not explained therein the mode in which he has contemplated best applying that principle so as to distinguish it from other inventions, and because he has not particularly pointed out the part and *improvement* existing in the Barker burner, and because he did not furnish any drawings or model of the Barker burner to the Patent Office," all which he was required to do by *sections* 4888 and 4889 *of the Revised Statutes.*

Brown vs. *Selby*, 4 *Fish. Pat. C., p.* 370.

A patent is a contract between the inventor and the government representing the public. The consideration moving from the inventor is the production of a new and useful thing, and the giving to the public a full knowledge thereof, by means of a proper application for a patent, whereby the public is enabled to practice the invention when the patent expires.

Ransom *vs.* The Mayor, 1 Fisher Patent Cases, 252.

If the invention is not so described as to be known from every other thing, the patent is void.

Brooks *vs.* Jenkins, 3 McLean, 442.

No defects can be obviated by extraneous evidence at the trial (*id.*).

One object of the specification is that while the patent is in force others may be informed of the precise claim of the patentee, so as not ignorantly to infringe his exclusive rights.

Parker *vs.* Stiles, 5 McLean, 55.

The patentees, to make their title good, must describe fully and clearly their whole invention and the method of using it.

If anything material in respect to its construction or working is omitted in the specification, they lose all claim to the exclusive use of their discovery.

In view of the well settled law on this subject, assuming that appellee had in fact before his application invented a

burner like the Barker burner, in which the flame does not revolve when the burner is regulated, and which burner can be made of two pieces, instead of three, and at half the expense of the burner described in Clough's specification and drawings and model C, it is impossible to hold that this patent covers the Barker burner. Why did he omit to describe such a burner? Why did he omit to call attention to its operation without revolving the flame? Why did he omit to call attention to its cheapness and its peculiar construction? His witness, *Kitchen*, thought it "a pity" that Clough did not perfect and describe such burner (foot of p. 117.)

The court can see that appellee's burners *were not* made in accordance with appellant's specifications and drawings.

Sixth.—It is extremely difficult to give a construction to Clough's patent sufficiently narrow to save it. Judge Blatchford, however, held, that notwithstanding all the elements of the combination claimed were old, and notwithstanding that the combination of a bat's-wing burner perforated at the base with a surrounding tube was old, and notwithstanding that the combination made up of the last mentioned combination and a tubular valve was old, yet that appellant was entitled to the specific form of mechanical device described in his specification and drawings, and not to that shown in the Solliday and Horace Barker and Coolidge *burners*. The appellant was not then entitled to recover, however, because the *appellees have never made or used that particular form of device*, but a different device, and, therefore, they do not infringe.

McCormick *vs.* Talcott, 20 How., 402.
Singer *vs.* Walmsley, 1 Fish. Pat. Cases, 558, 573.
Case *vs.* Brown, 2 Wallace, 320.
Burr *vs.* Duryee, 1 Wallace, 572.

Carlton *vs.* Bokee, 17 Wallace, 463.
Dennis *vs.* Eddy, Woodruff, J., 4 Fish. Pat. C., 423.
Brown *vs.* Selby, 4 Fish. Pat. C., p. 576.
Opinion of Judge Blatchford, p. 128.

I.—No construction whatever can be given to the first claim sufficiently narrow to save that.

See Third Point, *supra.*

The claim is broad and general to "the bat's-wing burner perforated at the base in combination with the surrounding tube."

No anterior kind of bat's-wing burner perforated at the base in combination with a surrounding tube, is pointed out in the patent, or there conceded to be old.

As the proof shows that at the date of the alleged invention there were in existence bat's-wing burners perforated at the base combined with surrounding tubes, and as plaintiff has entirely omitted to say what was old, and has entirely omitted to point out what the particular thing is, which he claims as new in his particular combination in his first claim, that claim is void.

Burr *vs.* Duryee, *supra*, 581.

There is no material difference in the bat's-wing burner stem of appellant and that of Coolidge and Horace R. Barker and Solliday.

If there is a difference it is in the size and length of the bat's-wing slit, or the shape and location of the perforations in the burner stem, but these are *immaterial differences,* as all the witnesses agreed, and differences which are not referred to in the specifications.

The difference, if any, then, must be in the surrounding tube, closed at the bottom and open at the top. But Solliday's is closed at the bottom and open at the top. Coolidge and Horace R. Barker's are both closed at the bottom always, and open at the top, *except when screwed on to the cone at the top of the burner stem.*

The Coolidge and Barker burners, therefore, *contain* such a surrounding tube, except at such times as they are screwed to the cone. These burners, therefore, undeniably *contain that part of the alleged invention.* Judge Blatchford so held.

Assuming, however, by the narrow construction of plaintiff's first claim that he is entitled to the particular device that he describes, to wit, a burner with an immovable surrounding tube, *such as he describes,* one that might be *soldered on,* for instance, as he says that it "may be attached in any manner" (p. 81, fol. 177), a tube *never in contact with the perforations in the burner stem,* a tube never *operating to open or close* the perforations—a construction in which there is always a *space* between the burner pillar and the tube its entire length; a perfectly straight tube of equal diameters, a tube with no chamber in it, as in Barker's "Exhibit E;" a tube with no socket or seat in it, as in the other form described and shown in Exhibit D; it is very plain that appellees do not infringe it, as their tube differs from it in all the above-mentioned respects. Its operation is totally different, because the tube in appellant's first claim is *fixed.* It does not open or close any perforations. It does not shut off the external supply of gas by being moved up, as does Exhibit D, nor by being moved down, as does Exhibit E, nor does it permit an external supply of gas by being moved down, as does Exhibit D, nor by being moved up, as does Exhibit E.

The structures being different, the operation being different, appellees' burner does not infringe the first claim.

Cases, supra.

II.—Construed narrowly as the second claim must be, if sustained at all (see fourth point, *supra*), the appellees do not infringe it.

Defendant's device is totally different from that of appellants'.

That it is wholly different is apparent from the fact

that appellees' burner *costs but one-half that of appellants'*, and such a difference is conclusive.

"The law protects simplicity and economy of construction as against prior complex and expensive combinations."

The Stanley Works vs. *Sargent & Company*, 4 *Fish. Pat. C.*, 443, 446.

King vs. *Hammond*, 4 *Fish. Pat. C.*, *p.* 488.

Appellees use no internal tubular valve. Clough's burner has five screw threads. Barker's but three. Appellees make the exterior sleeve do the work which appellants do by their tubular valve. The operation of appellees' burner is different. The result of its operation is different and *useful*. The flame does not revolve in adjusting it. The very fact that appellees' burner is a patentable improvement on appellants' burner (for which see points in case No. 64), proves that appellees' burner is not the device nor substantially the device contained in Clough's second claim.

See McCormick vs. *Talcott and other cases, supra.*

Lastly.—The decree of the Circuit Court should be affirmed, on the ground that appellants' patent is void, or if so narrowly construed as to be valid, then on the ground that the appellees do not infringe it when thus narrowly construed. And in any event, the decree should be affirmed by reason of the many errors of the court and of the jury above pointed out.

STANLEY & CLARKE,
Solicitors for Appellees.

WILLIAM STANLEY,
Of Counsel.

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